

***Characterization Results
Report for Operable Unit 3-13
Group 3, Other Surface Soils
Remediation Set 1 (Phase 1):
CPP-92, CPP-98, CPP-99, and
CPP-97***

**Idaho
Completion
Project**

Bechtel BWXT Idaho, LLC

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**Characterization Results Report for
Operable Unit 3-13 Group 3,
Other Surface Soils Remediation Set 1 (Phase 1):
CPP-92, CPP-98, CPP-99, and CPP-97**

February 2005

**Idaho Completion Project
Idaho Falls, Idaho 83415**

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ABSTRACT

This Characterization Results Report was prepared to document Operable Unit 3-13, Group 3, Remediation Set 1 (CPP-92/-98/-99 and CPP-97) characterization activities performed for the Idaho Nuclear Technology and Engineering Center (INTEC) at the Idaho National Laboratory (INL). This report is identified as one of the deliverables outlined in the Group 3 Remedial Design/Remedial Action Work Plan. Remediation Set 1 consists of soils and debris that originated from various INTEC construction and remediation projects between 1993 and 1995. Previous sampling results indicated the wastes exceeded the Operable Unit 3-13 remediation goals for strontium-90 and cesium-137. Historical information and process knowledge suggest the potential for iodine-129 (I-129) contamination. The objective of the characterization activity was to collect representative samples for analysis to provide the data necessary to determine whether the wastes meet the Waste Acceptance Criteria (WAC) at the INEEL CERCLA Disposal Facility (ICDF) landfill.

Organic and inorganic sample results from CPP-92/-98/-99 and CPP-97 meet the Universal Treatment Standards as specified in 40 CFR 268.48. Other than thallium at CPP-97, the organic and inorganic data from CPP-92/-98/-99 and CPP-97 meet the concentration guidelines of the ICDF WAC. Other than I-129 as discussed below, radiochemical data from CPP-92/-98/-99 and CPP-97 meet the concentration guidelines of the ICDF WAC.

The original I-129 analyses resulted in approximately 30% of I-129 results being nondetects. Due to analytical interferences, approximately 70% of the I-129 results were qualified for exceeding the minimum detectable activity (MDA) requirement of 1.0 pCi/g. As a corrective action, three samples with high MDAs (those most likely to contain I-129) were reanalyzed at a different laboratory using a sample preparation step to remove the interferences in an attempt to meet the MDA requirement. All three samples were statistical nondetects for I-129, which suggest that other qualified results due to elevated MDAs are also nondetects. Results from the reanalysis, combined with the absence of a positive I-129 detection in any sample, provide adequate confirmation that the soils and debris from Remediation Set 1 do not contain I-129.

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ACRONYMS

| | |
|--------|---|
| AA | alternative action |
| COC | contaminant of concern |
| DQO | data quality objective |
| DS | decision statement |
| ICDF | INEEL CERCLA Disposal Facility |
| ICP | Idaho Completion Project |
| INL | Idaho National Laboratory |
| INTEC | Idaho Nuclear Technology and Engineering Center |
| IWTS | Integrated Waste Tracking System |
| L&V | limitation and validation |
| LDR | land disposal restriction |
| MDA | minimum detectable activity |
| MS/MSD | matrix spike/matrix spike duplicate |
| OU | operable unit |
| PCB | polychlorinated biphenyl |
| PSQ | principal study question |
| PVC | polyvinyl chloride |
| QAPjP | Quality Assurance Project Plan |
| QC | quality control |
| RD/RA | remedial design/remedial action |
| RG | remediation goal |
| ROD | Record of Decision |
| RPD | relative percent difference |
| SSA | Staging and Storage Annex |
| SVOC | semivolatile organic compound |

| | |
|------|--|
| TCLP | toxicity characteristic leaching procedure |
| UTS | Universal Treatment Standard |
| VOC | volatile organic compound |
| WAC | Waste Acceptance Criteria |
| WGS | Waste Generator Services |

Characterization Results Report for Operable Unit 3-13, Group 3, Other Surface Soils Remediation Set 1 (Phase 1): CPP-92, CPP-97, CPP-98, and CPP-99

1. INTRODUCTION

This Characterization Results Report was prepared to document the characterization activities performed for the Idaho Nuclear Technology and Engineering Center (INTEC) at the Idaho National Laboratory (INL)^a under the *Operable Unit 3-13, Group 3, Other Surface Soils, Remediation Sets 1-3 (Phase I) Characterization Plan* (DOE-ID 2004a). This report is identified as one of the deliverables outlined in Table 6-1 of the Group 3 Remedial Design/Remedial Action (RD/RA) Work Plan (DOE-ID 2004b).

1.1 Objectives and Scope

As stated in the Characterization Plan, the objective of the characterization activities was to “verify that soil and debris in Operable Unit (OU) 3-13, Group 3, Phase 1 remediation sites exceeding the remediation goals (RGs) established in the OU 3-13 Record of Decision (ROD) (DOE-ID 1999) meet the Waste Acceptance Criteria (WAC) for disposal at the INEEL CERCLA Disposal Facility (ICDF).”

The scope of work outlined in the characterization plan included the sampling design, the methods used for sample collection, the types of analyses required, and the data quality and validation requirements. Samples were analyzed for radiochemistry, Appendix IX volatile organic compounds (VOCs), Appendix IX semivolatile organic compounds (SVOCs), total metals, Universal Treatment Standard (UTS) metals assessed using the toxicity characteristic leaching procedure (TCLP), and polychlorinated biphenyls (PCBs) (Table 1-1). Sample results are compared against the OU 3-13 contaminants of concern (COCs), Table UTS of 40 CFR 268.48, and Table 3-3 of the ICDF Landfill WAC (DOE-ID 2004c). Because of the lack of historical data, special efforts were made to characterize the wastes for iodine-129 (I-129).

a. Beginning February 1, 2005, the name of the Idaho National Engineering and Environmental Laboratory (INEEL) was changed to Idaho National Laboratory (INL). The Idaho Completion Project (ICP) is the name of the project that is performing remediation work at the Idaho National Laboratory.

Table 1-1. Types of analyses performed for Remediation Set 1 samples.

| OU 3-13 Contaminants of Concern ^a | Analyses for ICDF Waste Profile ^b |
|--|--|
| Mercury | Appendix IX VOCs |
| Americium-241 | Appendix IX SVOCs |
| Cesium-137 | Total metals |
| Europium-152 | UTS metals assessed via TCLP |
| Europium-154 | PCBs |
| Plutonium-238 | I-129 |
| Plutonium-239/240 | |
| Plutonium-241 | |
| Strontium-90 | |

a. From Table 8-1 of the OU 3-13 Record of Decision (DOE-ID 1999).

b. For comparison against the ICDF Landfill WAC (DOE-ID 2004c) and Table UTS of 40 CFR 268.48.

2. REMEDIATION SET 1 BACKGROUND

Remediation Set 1 consists of soils and debris that originated from various INTEC construction and remediation projects between 1993 and 1995. Previous sampling results indicated the wastes exceeded the OU 3-13 RGs for strontium-90 (Sr-90) and cesium-137 (Cs-137), and historical information and process knowledge suggest the potential for I-129 contamination. However, additional organic, inorganic, and radiological data were needed to complete the waste profile prior to disposal in the ICDF landfill. A summary of the types of wastes and the source of the wastes for Remediation Set 1 is provided below and in Table 2-1. Detailed site descriptions and discussions of process knowledge, including the preliminary sampling and characterization efforts, are provided in Section 3 of the RD/RA Work Plan (DOE-ID 2004b).

2.1 CPP-97

Site CPP-97, located in the northeast portion of INTEC, includes two tarp-covered soil stockpiles that were generated from waste soil that originated from the tank farm upgrade project. The south stockpile contains approximately 1,093 m³ (1,430 yd³) of radionuclide-contaminated soils. The north stockpile contains approximately 53 m³ (70 yd³) of radionuclide-contaminated soils.

Table 2-1. OU 3-13, Group 3, Remediation Set 1 background information.

| Site | Description | Waste Type/ Description | COCs ^a Exceeding Soil RGs ^b | Process Knowledge |
|--------|--|---|--|--|
| CPP-97 | Tank farm soil stockpile—two tarp-covered stockpiles and contaminated surface soil | Soil South pile: 0-3 mR/hr North pile: 3-50 mR/hr | Cs-137, Sr-90 No data for Eu-152 and Pu-241 | Indicates source of the waste is from tank farm upgrade |
| CPP-92 | Boxed soil—653 boxes | Soil (primary), debris, and personal protective equipment | Cs-137, Sr-90 No data for Pu-241 | Indicates source of waste is from tank farm upgrade and other excavations at INTEC |
| CPP-99 | Boxed soil—58 boxes | Soil, concrete, metal, wood, and other noncompactable debris | Cs-137, Sr-90 ^c | Indicates source of waste is from tank farm upgrade and CPP-604 tunnel excavation |
| CPP-98 | Tank farm shoring boxes—119 boxes | Soil, wood, metal | Cs-137, Sr-90 ^c | Indicates source of waste is from tank farm upgrade |

a. COC = contaminant of concern.

b. RGs as listed in OU 3-13 ROD (DOE-ID 1999).

c. Soil COCs exceeding RGs for Sites CPP-98 and CPP-99 are assumed to be representative of the expected COCs for CPP-97 and CPP-92.

2.2 CPP-92

Site CPP-92 is containerized waste located in the southwest portion of INTEC, west of CPP-1617, in the Staging and Storage Annex (SSA), CPP-1789. This site consists of 653 boxes containing soil (571 boxes) and soil/debris (82 boxes) that were generated from various INTEC plant projects, including

- Tank farm upgrade.
- Various Comprehensive Environmental Response, Compensation and Liability Act remediation projects.
- Building CPP-603 cleanup.
- Construction of the emergency fire exit tunnel for Building CPP-604/605 (Site CPP-89). The excavated soils were part of the tunnel excavation just south of and under CPP-604.
- Miscellaneous soil excavations at INTEC where soil contamination was encountered.
- Cleanup of soil and debris at Site CPP-17. Site CPP-17 was divided into two separate sites, CPP-17A and CPP-17B. These sites were used for storing piles of soil and debris that reportedly came from a variety of construction and maintenance activities within the INTEC.

The OU 3-13 ROD identified that CPP-92 had 648 boxes. However, through the use of the Integrated Waste Tracking System (IWTS) and physical inventories, 653 boxes were identified by Waste Generator Services (WGS).

2.3 CPP-98

Site CPP-98 is containerized waste consisting of 119 boxes of debris located in the southwest portion of INTEC, west of CPP-1617, in the SSA. The boxes contain wooden shoring used during the tank farm upgrade project. The OU 3-13 ROD identified that CPP-98 had 118 boxes (DOE-ID 1999). However, through the use of the IWTS and a physical inventory, 119 boxes have been identified by WGS. Because the tank farm soil was contaminated, the shoring also became contaminated and was placed into wooden waste boxes lined with a polyethylene membrane. The Work Plan (DOE-ID 2004b) and Characterization Plan (DOE-ID 2004a) state that, because soil data from Site CPP-97 are assumed to be representative of the expected contamination on the CPP-98 containerized debris, sampling of the CPP-98 boxes will not be required.

2.4 CPP-99

Site CPP-99 is a group of boxes located in the southwest portion of INTEC, west of CPP-1617, in the SSA. This site consists of 58 boxes containing radionuclide-contaminated soil (14 boxes), soil/debris (43 boxes), and unknown contents (1 box) generated from the tank farm upgrade and CPP-604/605 emergency fire tunnel excavation projects. The OU 3-13 ROD identified that CPP-99 had 59 boxes (DOE-ID 1999). However, through the use of the IWTS and a physical inventory, 58 boxes have been identified by WGS. The boxes are wooden waste boxes lined with a polyethylene membrane. The soil data from Sites CPP-97 and CPP-92 are assumed to be representative of Site CPP-99. Additionally, data are also available for the excavated soil from the excavation for the fire exit from Building CPP-604/605 (Site CPP-92) and are assumed to be representative of Site CPP-99, as well.

3. DATA QUALITY OBJECTIVES

The data quality objectives (DQOs) for this project were established in the Group 3 Remediation Set 1 Characterization Plan (DOE-ID-2004a). The DQOs qualitatively and quantitatively specify the objectives for the data collected and directed the characterization activities. The DQO process includes seven steps, each of which has specific outputs. These steps, as applied to the characterization activities for Remediation Set 1, are summarized below.

3.1 Problem Statement

The problem statement is intended to define the problem so that the focus of the sampling and analysis will be unambiguous. The problem statements as stated in the Characterization Plan are as follows:

- Determine whether sites require remediation
- Determine whether the wastes can be disposed of at the ICDF landfill
- Determine if those wastes requiring remediation for which I-129 is suspected can be disposed of in the ICDF landfill.

3.2 Principal Study Questions and Decision Statements

This step in the DQO process identifies the decisions and actions to be taken based on the data collected. Principal study questions (PSQs) and alternative actions (AAs) are developed, and the PSQs and AAs are then combined into decision statements (DSs). The PSQs and DSs developed for Remediation Set 1 are summarized below:

- The first PSQ (*PSQ1: Do the COCs exceed the Remediation Goals (RGs)?*) and subsequent decision statement (DS1) indicated that the Remediation Set 1 soils and debris already exceeded RGs and that additional sampling was not needed to make this determination.
- The second PSQ (*PSQ2: Can the waste, based on the waste profile, be disposed of in the ICDF landfill?*) and decision statement (DS2) indicated that the current waste profiles for Remediation Set 1 were insufficient and that additional sampling was needed to complete the waste profile prior to disposal.
- The third PSQ (*PSQ3: Do process knowledge or the I-129 sample results indicate that the waste for each site to be remediated and disposed of in the ICDF landfill meet the ICDF landfill WAC?* [DOE-ID 2004c]) and decision statement (DS3) objective indicate that there was insufficient I-129 data and that additional sampling was needed to assess the waste before disposal at the ICDF landfill.

Table 3-1 summarizes the data collection strategy required to resolve the decision statements for Remediation Set 1. The detailed DQO discussion and evaluation of the data needs for each site are provided in Section 3, Section 5, and Appendix A of the RD/RA Work Plan (DOE-ID 2004b).

Table 3-1. Data requirements for the Operable Unit 3-13, Group 3, Remediation Set 1.

| Site | Decision Statement 1—Determine if Remediation is Required | | Decision Statement 2—Waste Profile | | Decision Statement 3—I-129 Mass | |
|--------|---|-----------------------------|---|---|--|--|
| | Data Gap | Additional Samples Required | Data Gap | Additional Samples Required | Data Gap | Additional Samples Required |
| CPP-97 | None – Remediation is required – Soils COCs are greater than ROD RGs. | None ^a | Organics, inorganics, and radionuclides | Six samples. The piles will be sampled at random locations on the soil pile at the east, west, and south face of each pile for a total of six samples. | No characterization data available. | Three samples (smaller stockpile). Samples will be collected during DQO-2 sampling. |
| CPP-92 | None – Remediation is required – Soils COCs are greater than ROD RGs. | None ^a | Organics, inorganics, and radionuclides | The boxed soil will be segregated for sampling purposes into three levels as stated in the text. The sampling approach will include randomly selecting approximately 5% of the boxes from each level to be sampled, except for Level 3 in which samples will be collected from all the boxes. Samples will then be collected from the boxes and randomly composited in groups of two for Levels 1 and 2 and in groups of three (all Level 3 boxes) for Level 3: Level 1 – 24 boxes – 12 samples Level 2 – 6 boxes – 3 samples Level 3 – 3 boxes – 1 sample. | I-129 was detected in one sample (from CPP-89). | 59 samples. Three biased samples will be collected from the >50-mR/hr level and the remaining 56 samples will be randomly collected from CPP-92 and CPP-99. |
| CPP-98 | None – Remediation is required – Soils COCs are greater than ROD RGs. | None ^a | No characterization data available ^b | To be combined with CPP-92. | No characterization data available. ^b | To be combined with CPP-92. |
| CPP-99 | None – Remediation is required – Soils COCs are greater than ROD RGs. | None ^a | No characterization data available ^b | To be combined with CPP-92. | No characterization data available. ^b | To be combined with CPP-92. |

a. RGs obtained from OU 3-13 ROD (DOE-ID 1999).

b. Soil COCs exceeding RGs for Sites CPP-98 and CPP-99 are assumed to be representative of the expected COCs for CPP-97 and CPP-92.

4. CHARACTERIZATION METHODS AND ACTIVITIES

Characterization activities were performed under the project-specific Characterization Plan (DOE-ID 2004a). Sampling of the boxed soil (CPP-92 and CPP-99) took place inside the INTEC SSA at CPP-1789. Sampling of the tank farm soil stockpiles (CPP-97) took place at the stockpile sites. Characterization activities began on April 15, 2004, and concluded on May 18, 2004. Because of uncertainty associated with the I-129 results, a corrective action was taken in December 2004 to reanalyze three I-129 samples using an alternative method. Discussions of the corrective action, the analytical methods, and the subsequent validation approach are provided in Section 4.3 and Section 5.1.4 of this report. The methods and materials used to characterize Remediation Set 1 are described below.

4.1 CPP-92, -98, -99 Boxed Soil Sets

Sampling was not required for CPP-98 container debris because CPP-92 and CPP-97 soil data were determined to be representative of the debris contamination.

Characterization of CPP-92 and CPP-99 soil boxes was performed using a stratified approach based on the boxes' radiation measurements from the IWTS. Appendix A lists the identification numbers of the boxes sampled and their associated radiation levels. The soil boxes were divided into three "levels" based on radiation measurements:

- Level 1: Radiation measurements ≤ 5 mR/hr on contact
- Level 2: Radiation measurements >5 and ≤ 50 mR/hr on contact
- Level 3: Radiation measurements >50 mR/hr on contact.

Table 4-1 outlines the number of soil waste containers within the respective grouping levels, the number of boxes sampled, the number of composite samples collected, and the volume of soil in each level.

Table 4-1. Sampling matrix for CPP-92, -98, -99 soil waste boxes.^a

| Description | Level 1 | Level 2 | Level 3 |
|---------------------------------------|----------------|--------------------------------|----------------|
| | ≤ 5 mR/hr | >5 mR/hr and ≤ 50 mR/hr | >50 mR/hr |
| CPP-92 soil boxes ^b | 460 | 107 | 4 |
| CPP-98 soil boxes ^c | — ^d | — ^d | — ^d |
| CPP-99 soil boxes ^e | 11 | 3 | — ^d |
| Total soil boxes | 471 | 110 | 4 |
| Volume (yd ³) | 1,128 | 266 | 9.5 |
| Number of boxes to be sampled | 24 | 6 | 4 |
| Number of composite samples collected | 12 | 3 | 1 |
| Number of I-129 samples collected | 43 | 12 | 4 |

a. The number of boxes listed above corrects for a slight discrepancy in the Characterization Plan (DOE-ID 2004a).

b. CPP-92 inventory includes 571 soil and 82 debris boxes.

c. CPP-98 inventory includes 119 debris boxes.

d. “—” = not applicable.

e. CPP-99 inventory includes 14 soil boxes, 43 debris boxes, and 1 box with unspecified content.

Five percent of the Level 1 and Level 2 boxes were sampled. For Level 1, 24 boxes were sampled by collecting 12 composite sample sets (two boxes per composite sample). For Level 2, six boxes were sampled by collecting three composite sample sets (plus a duplicate) (two boxes per composite sample). The four Level 3 boxes were characterized by collecting one composite sample set (plus a duplicate).

Composite sampling was accomplished by collecting five subsamples from each box using a 4-in. stainless-steel hand auger and placing the soil into a dedicated aluminum pan. For Level 1 and Level 2 sampling, five more subsamples were collected from the second box and combined in the pan with the subsamples from the first box. For Level 3 sampling, five subsamples were collected from all four boxes and combined into an aluminum pan. Before mixing the composited sample material, VOC and SVOC samples were collected to prevent loss to volatilization. After VOC and SVOC sample collection the soils were thoroughly mixed and the remaining sample jars were filled using disposable plastic scoops. As discussed below, an additional grab sample was collected from each box for I-129 analysis. The samples were labeled, dated, preserved, and transported to the off-Site laboratory in accordance with the procedures outlined in the Characterization Plan (DOE-ID 2004a).

Samples were analyzed for Appendix IX VOCs, Appendix IX SVOCs, UTS metals, total metals, PCBs, and radiochemistry. UTS metals were assessed using the TCLP. Because dedicated and disposable sampling equipment was used for each level, rinsate samples were not required. A field blank was collected during Level 1 sampling and sent for radiological analyses. Contents of waste containers were verified and recorded in the field logbook.

As specified in the Characterization Plan, a total of 59 grab samples were required for I-129 analysis from the Level 1, Level 2, and Level 3 boxes (Table 4-1). Thirty-four of the 59 I-129 samples were collected from each of the "waste profile" boxes as described above (24 from Level 1 boxes, 6 from Level 2 boxes, and 4 from Level 3 boxes). The remaining 25 I-129 samples were collected from other Level 1 and Level 2 boxes (19 samples from Level 1 boxes; 6 samples from Level 2 boxes).

4.2 CPP-97, Tank Farm Soil Stockpile

Site CPP-97 comprises two soil stockpiles (the "south" stockpile and "north" stockpile) located near the northeast corner of INTEC (Figure 4-1). Three sampling locations were selected on each soil stockpile: east face, west face, and south face. Sampling locations ranged from ~3 to 7 ft above the base of the soil stockpiles. A duplicate sample set was collected from the east-facing portion of the south stockpile.

To control the potential spread of soil contamination, a sampling portal device was used for sample collection. The portal device consisted of 4-1/2-in.-diameter polyvinyl chloride (PVC) pipe and cap (approximately 8 in. long) bonded to a flexible self-adhering pipe boot used in commercial roofing. The portal device was attached to the tarp and a 2-ft-square piece of heavy-mil plastic sheeting (apron) bonded to the port was extended prior to sampling to contain the soil material during the sampling process.

A 4-1/2-in. hole was then cut through the tarp via the inside of the PVC port. Using a 4-in. stainless-steel hand auger inserted through the sampling port, the first 4 in. of soil were removed and segregated so that it was not included in any of the samples. The VOC and SVOC samples were collected first and placed directly into sample containers. Three to four auger volumes were then collected and placed into an aluminum pan and thoroughly mixed; and larger rocks (those greater than ~1/2-in. diameter) were removed. The remaining sample set was collected into the appropriate sample containers. When sampling was completed, the first 4 in. of soil were replaced, and the plastic sheeting was gathered and placed back.

4-3

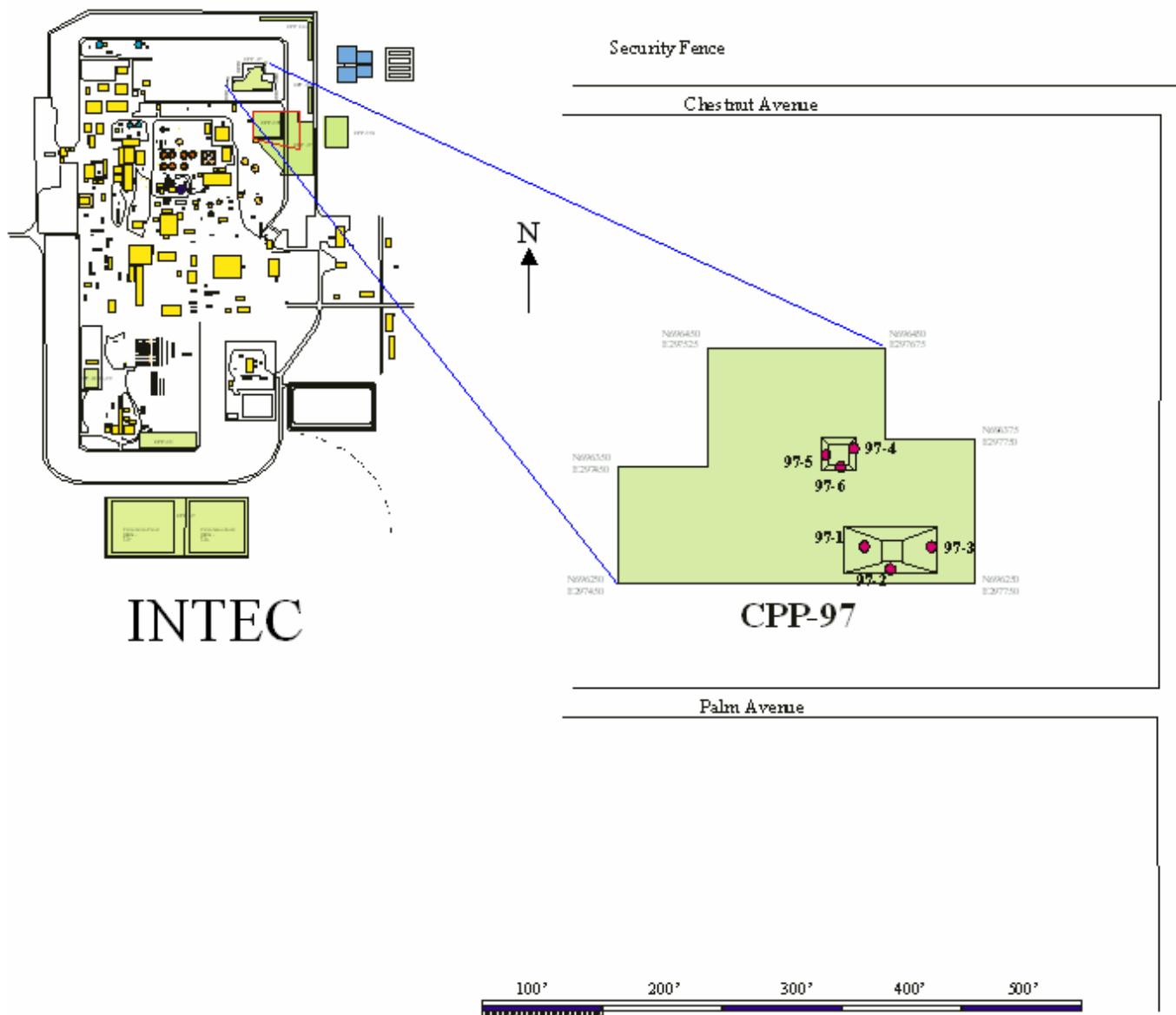


Figure 4-1. Sampling locations for CPP-97 at INTEC.

into the sample port with any residual media. The PVC cap was replaced to seal the port. Caulking sealant was then placed around the base of the sampling port and around the sampling port cap to prevent moisture infiltration.

The samples were labeled, dated, preserved, and transported in accordance with the sample collection procedures (Section 4) of the Characterization Plan (DOE-ID 2004a). Each sample set was analyzed for Appendix IX VOCs, Appendix IX SVOCs, TCLP metals, total metals, PCBs, and radiochemistry, including I-129.

4.3 Laboratory Methods and Data Validation

Standard radiochemistry and chemical analysis practices were used to ensure the method detection limits approached those prescribed in the analytical laboratory statement of work (ER-SOW-394). As specified in the Characterization Plan (DOE-ID 2004a) and Quality Assurance Project Plan (QAPjP) (DOE-ID 2004d), analytical data were validated in accordance with a “Level B” validation as defined in GDE-7003, “Levels of Analytical Method Data Validation,” and in accordance with either GDE-201, “Inorganic Analyses Data Validation for INEEL Sample and Analysis Management”; GDE-205, “Radioanalytical Data Validation”; or GDE-240, “Validation of Gas and Liquid Chromatographic Organic Data,” as applicable.

As part of a corrective action, additional analyses were performed for I-129. The first analytical method used for I-129 analysis (standard laboratory counting geometry and direct counting of the soil by low-energy photon spectrometry) was susceptible to interference from other isotopes (e.g., Cs-137, Sr-90) and did not consistently achieve the 1.0-pCi/g minimum detectable activity (MDA) DQO requirement. As a result, three I-129 samples with high MDAs were transferred to another laboratory for reanalysis using an alternative analytical method that used a radiochemical separation step to isolate I-129 from potentially interfering radionuclides. The second method was used to heat the sample in a muffle furnace under alkaline conditions, perform a solvent/aqueous extraction, and precipitate the sample as silver iodide. The second method allowed I-129 to be detected with better sensitivity by low-energy photon spectrometry. The I-129 reanalysis was given a “Level A” validation in accordance with GDE-205.

5. RESULTS

This section provides a highlight of the results obtained from the sample analyses. An expanded summary that includes all of the detected inorganic, organic, and radiological analytes is provided in Appendix B. The Limitation and Validation (L&V) reports previously transmitted (Kuhns 2004, Verwolf 2004) contain a complete listing of all the results for the project.

5.1 CPP-92/-98/-99: Level 1, 2, and 3 Soil Boxes

5.1.1 Organic Results for CPP-92/-98/-99

Results for VOCs, SVOCs, and PCBs were compared to the organic constituents listed in Table UTS of 40 CFR 268.48 and to Table 3-3 of the ICDF Landfill WAC (DOE-ID 2004c), as applicable. Maximum concentrations for organic constituents detected in Level 1, Level 2, and Level 3 boxes are listed in Table 5-1. Highlights for the organic data are

- All applicable and positively detected VOC and SVOC analytes are less than the standards listed in Table UTS of 40 CFR 268.48 by at least an order of magnitude (10 \times).
- All applicable and positively detected VOCs, SVOCs, and PCBs are less than the standards listed in the ICDF Landfill WAC.
- Over 95% of the organic results were either nondetect (U-flagged) or estimated nondetect (UJ-flagged).

5.1.2 Inorganic Results for CPP-92/-98/-99

Inorganic results for both TCLP metals and total metals are discussed below. The results for TCLP metal were compared to the TCLP constituents listed in Table UTS of 40 CFR 268.48. Results for total metals were compared to Table 3-3 of the ICDF Landfill WAC (DOE-ID 2004c). Maximum concentrations for inorganic constituents detected in Level 1, Level 2, and Level 3 boxes are listed in Tables 5-2 and 5-3. Highlights for the inorganic data are

- All positively detected TCLP inorganic concentrations are at least 10 times below the concentrations listed in Table UTS of 40 CFR 268.48.

Table 5-1. Maximum concentrations of organic compounds detected in Level, 1, 2, and 3 soil boxes.

| Constituent | Concentration (mg/kg) | LDR ^a Limit (mg/kg) | ICDF WAC (mg/kg) | Sample Number | Location | Validation Qualifier |
|---------------------|--------------------------|--------------------------------------|---------------------|---------------|--------------------|-------------------------|
| 1,4-Dichlorobenzene | 0.0019 | 6 | 44 | E0130400601AZ | Level 1, Box 13-14 | — ^b |
| Acetone | 0.0215 | 160 | 49 | E0130400401AV | Level 1, Box 9-10 | J |
| Methylene chloride | 0.0022 | 30 | 27 | E0130400401AV | Level 1, Box 9-10 | J |
| Pyrene | 0.0819 | 8.2 | 250 | E0130401201HN | Level 2, Box 1-2 | J |
| Toluene | 0.00076 | 10 | 30 | E0130401501AV | Level 3, Box 1-4 | J |
| Aroclor-1254 | 0.202 | Not listed | 130 | E0130400001PC | Level 1, Box 1-2 | — |
| Aroclor-1260 | 0.0187 | Not listed | 500 | E0130400601PC | Level 1, Box 13-14 | — |

a. LDR = land disposal restriction.

b. “—” = no validation qualifier.

Table 5-2. Maximum concentrations of TCLP metals detected in Level, 1, 2, and 3 soil boxes.

| Constituent | Concentration (mg/L) | LDR Limit (mg/L) | Sample Number | Location | Validation Qualifier |
|-------------|-------------------------|---------------------|---------------|--------------------|----------------------|
| Antimony | 0.057 | 1.15 | E0130400801VY | Level 1, Box 17-18 | — ^a |
| Barium | 0.97 | 21 | E0130400201VY | Level 1, Box 5-6 | — |
| Beryllium | 0.006 | 1.22 | E0130400501VY | Level 1, Box 11-12 | — |
| Chromium | 0.029 | 0.6 | E0130400401VY | Level 1, Box 9-10 | — |
| Lead | 0.037 | 0.75 | E0130400601VY | Level 1, Box 13-14 | — |
| Mercury | 0.0171 | 0.025 | E0130400601VY | Level 1, Box 13-14 | — |
| Nickel | 0.086 | 11 | E0130400901VY | Level 1, Box 19-20 | — |
| Selenium | 0.036 | 5.7 | E0130401001VY | Level 1, Box 11-12 | — |
| Vanadium | 0.01 | 1.6 | E0130400801VY | Level 1, Box 17-18 | — |
| Zinc | 0.042 | 4.3 | E0130400901VY | Level 1, Box 19-20 | — |

a. “—” = no validation qualifier.

Table 5-3. Maximum concentrations of total metals detected in Level, 1, 2, and 3 soil boxes.

| Constituent | Concentration (mg/kg) | ICDF WAC (mg/kg) | Sample Number | Location | Validation Qualifier |
|-------------|--------------------------|---------------------|---------------|--------------------|----------------------|
| Aluminum | 15,620 | 160,000 | E0130400401LM | Level 1, Box 9-10 | — ^a |
| Antimony | 1.3 | 5,800 | E0130400401LM | Level 1, Box 9-10 | J |
| Arsenic | 11.6 | 58 | E0130401302LM | Level 2, Box 3-4 | — |
| Barium | 180 | 3,000 | E0130400801LM | Level 1, Box 17-18 | J |
| Beryllium | 0.637 | 18 | E0130401501LM | Level 1, Box 11-12 | — |
| Cadmium | 0.659 | 3,600 | E0130400801LM | Level 1, Box 17-18 | — |
| Calcium | 100,840 | No limit | E0130401001LM | Level 1, Box 11-12 | J |
| Chromium | 28.6 | 41,000 | E0130400401LM | Level 1, Box 9-10 | — |
| Cobalt | 14.4 | 100 | E0130400401LM | Level 1, Box 9-10 | — |
| Copper | 22.4 | 30,000 | E0130400401LM | Level 1, Box 9-10 | — |
| Iron | 27,690 | 240,000 | E0130400401LM | Level 1, Box 9-10 | — |
| Lead | 14.5 | 58,000 | E0130401302LM | Level 2, Box 3-4 | — |
| Magnesium | 13,930 | 120,000 | E0130400401LM | Level 1, Box 9-10 | — |
| Manganese | 448 | 4,900 | E0130400401LM | Level 1, Box 9-10 | J |
| Mercury | 0.565 | 9,500 | E0130400201LM | Level 1, Box 5-6 | — |
| Nickel | 39.5 | 350 | E0130400401LM | Level 1, Box 9-10 | — |
| Potassium | 1,540 | 43,000 | E0130401501LM | Level 1, Box 11-12 | J |
| Selenium | 0.381 | 850 | E0130400901LM | Level 1, Box 19-20 | — |
| Silver | 0.54 | 9,800 | E0130401501LM | Level 1, Box 11-12 | — |
| Sodium | 1,800 | 3,200 | E0130400401LM | Level 1, Box 9-10 | — |
| Thallium | 2.17 | 43 | E0130401501LM | Level 1, Box 11-12 | — |
| Vanadium | 43.2 | 450 | E0130400401LM | Level 1, Box 9-10 | — |
| Zinc | 70.6 | 210,000 | E0130400401LM | Level 1, Box 9-10 | — |

a. “—” = no validation qualifier.

- Over 80% of the TCLP data are nondetect or estimated nondetect (UJ-flagged).
- All total metals concentrations are below the standards for the concentration/activities listed in the ICDF Landfill WAC, with most analytes being more an order of magnitude below the standards.

5.1.3 Radiochemistry Results for CPP-92/-98/-99

Radiochemistry results were compared to Table 3-3 of the ICDF Landfill WAC (DOE-ID 2004c). Maximum concentrations for radiological constituents (other than I-129) detected in Level 1, Level 2, and Level 3 boxes are listed in Table 5-4. Highlights for the radiochemistry data (other than I-129) are

- All positively identified radiochemical analytes are less than the standards listed in the ICDF Landfill WAC.
- Nearly all of the radiochemical analytes are several orders of magnitude less than the standards listed in the ICDF Landfill WAC.

Table 5-4. Maximum concentrations of radiological constituents detected in Level, 1, 2, and 3 soil boxes.

| Constituent | Concentration (pCi/kg) | ICDF WAC (pCi/kg) | Sample Number | Location | Validation Qualifier |
|-------------------|---------------------------|----------------------|---------------|--------------------|----------------------|
| Americium-241 | 6.62E+02 | 1.0E+07 | E0130401501RH | Level 3, Box 1-4 | — ^a |
| Cesium-134 | 3.6E-04 | 1.1E+07 | E0130401001RH | Level 1, Box 21-22 | — |
| Cesium-137 | 2.50E+05 | 2.3E+12 | E0130401502RH | Level 3, Box 1-4 | J |
| Cobalt-60 | 4.47E-04 | 1.9E+08 | E0130401201RH | Level 2, Box 1-2 | — |
| Europium-154 | 4.3E-03 | 8.2E+08 | E0130400901RH | Level 1, Box 19-20 | J |
| Neptunium-237 | 6.70E-01 | 6.4E+05 | E0130401501RH | Level 3, Box 1-4 | — |
| Plutonium-238 | 1.05E+04 | 1.0E+07 | E0130401502RH | Level 3, Box 1-4 | — |
| Plutonium-239/240 | 5.15E+03 | 1.5E+06 | E0130401502RH | Level 3, Box 1-4 | — |
| Radium-226 | 1.51E+00 | 4.7E+05 | E0130401501RH | Level 3, Box 1-4 | J |
| Strontium-90 | 7.78E+04 | 3.5E+12 | E0130401501RH | Level 3, Box 1-4 | — |
| Technetium-99 | 1.25E+03 | 5.8E+06 | E0130401501RH | Level 3, Box 1-4 | J |
| Thorium-228 | 3.92E+00 | 1.6E+04 | E0130401501RH | Level 3, Box 1-4 | J |
| Thorium-230 | 2.48E+00 | 1.4E+04 | E0130401501RH | Level 3, Box 1-4 | J |
| Thorium-232 | 1.23E+00 | 1.7E+04 | E0130401502RH | Level 3, Box 1-4 | — |
| Tritium | 8.47E-02 | 5.0E+07 | E0130401301RH | Level 2, Box 3-4 | — |
| Uranium-233/234 | 1.27E+01 | 6.0E+06 | E0130401502RH | Level 3, Box 1-4 | — |
| Uranium-235 | 1.49E+00 | 1.1E+05 | E0130401502RH | Level 3, Box 1-4 | — |
| Uranium-238 | 1.33E+00 | 2.0E+06 | E0130401501RH | Level 3, Box 1-4 | — |
| Zinc-65 | 1.8E-04 | Not listed | E0130400801RH | Level 1, Box 17-18 | — |

a. “—” = no validation qualifier.

5.1.4 I-129 Results for CPP-92/-98/-99

Fifty-nine grab samples (plus four duplicates) were initially analyzed for I-129. While I-129 was not positively detected, 44 of 63 sample results (including duplicates) did not meet the MDA of 1.0 pCi/g and were qualified “UJ” in the L&V report. The elevated MDAs were reportedly due to isotopic interference (high background) attributed to other radioisotopes (e.g., Cs-137 and Sr-90) in the sample. The MDAs for the CPP-92/-98/-99 samples ranged from 0.08-5.4 pCi/g. The L&V report stated that while I-129 was not considered to be truly present in the “UJ”-flagged samples, “the use of the results is strongly discouraged.” Without additional analyses, the usability of the “UJ”-flagged data was limited to stating that if I-129 is truly present in the sample, the concentration was less than or equal to the MDA reported for that sample.

Because of the uncertainty associated with the I-129 results and as part of a corrective action, a second analytical laboratory (BWXT Services-NEL Services, Inc) was identified that used a radiochemical separation technique designed to isolate I-129 from potentially interfering radionuclides and achieve a 1.0-pCi/g MDA. Although the 6-month holding time had been exceeded by 2 months, BBWI and the Agencies agreed to send the three available samples (two from CPP-92/-98/-99 and one from CPP-97) with the highest MDAs (samples with the highest potential for I-129 contamination) for reanalysis. The results from the reanalysis were to be used to (a) determine if the analytical method could meet the 1.0-pCi/g MDA, (b) confirm the presence or absence of I-129 in three samples most likely to contain I-129, and (c) make inferences as to the presence or absence of I-129 in the UJ-flagged samples from the first analysis.

The radiochemical separation technique was successful at meeting the MDA of 1.0 pCi/g for all three samples. As anticipated, the samples were initially qualified “UJ” by the validator due to the holding time exceedance. However, based on the professional judgment of the BBWI sample management office, due to the long half-life of I-129 (1.57 E+07 years) and the stable conditions under which the samples were stored, the data were not compromised by the missed holding times and the data should not be qualified. Consequently, the results were requalified to “U” as statistical nondetects to indicate the radionuclide is not considered to be present in the samples.

Results from the reanalysis provide supportive evidence that “UJ”-flagged data from the first analyses are also statistical nondetects and that I-129 is not truly present (Table 5-5). The results from the corrective action, combined with the absence of a positive detection of I-129 in any sample, provide sufficient confirmation that the soils meet the ICDF WAC for I-129. A complete listing of the I-129 results is provided in Appendix C.

Table 5-5. Comparison of I-129 results from two analytical methods for Sites CPP-92/-98/-99.

| Sample ID | Location | First Analyses (No Separation) | | | Second Analyses (Using Separation) | | |
|---------------|--------------------|--------------------------------|----------------|------------------------|------------------------------------|----------------|------------------------|
| | | Conc. (pCi/g) | MDA (pCi/g) | Uncertainty (pCi/g) | Conc. (pCi/g) | MDA (pCi/g) | Uncertainty (pCi/g) |
| E0130404801RI | Level 1, Box 33 | 41 UJ | 4.9 | 3.1 | 0.17 U | 0.41 | 0.12 |
| E0130405801RI | Level 1, Box 43 | 131 UJ | 5.3 | 7.8 | -0.23 U | 0.83 | 0.24 |

5.2 CPP-97 Soil Stockpiles

5.2.1 Organic Results for CPP-97

Results for VOCs, SVOCs, and PCBs were compared to the organic compounds listed in Table UTS of 40 CFR 268.48 and to Table 3-3 of the ICDF Landfill WAC (DOE-ID 2004c), as applicable. Maximum concentrations for organic compounds detected in the soil stockpiles are listed in Table 5-6. Highlights for the organic data are

- All applicable and positively detected VOCs and SVOCs are less than the concentrations listed in Table UTS of 40 CFR 268.48 by at least an order of magnitude.
- All applicable and positively detected VOCs, SVOCs, and PCBs are less than the concentrations listed in the ICDF Landfill WAC by at least an order of magnitude.
- Over 98% of the organic results were either nondetect (U-flagged) or estimated nondetect (UJ-flagged).

5.2.2 Inorganic Results for CPP-97

The results for TCLP metals were compared to the TCLP constituents listed in Table UTS of 40 CFR 268.48. Results for total metals were compared to Table 3-3 of the ICDF Landfill WAC (DOE-ID 2004c). Maximum concentrations for inorganic constituents detected in the soil stockpiles are listed in Tables 5-7 and 5-8. Highlights for the inorganic data are

- All positively detected TCLP inorganic concentrations are at least 10 times below the concentrations listed in Table UTS of 40 CFR 268.48.
- Over 75% of the TCLP data is nondetect or an estimated nondetect (UJ-flagged).
- *Nearly* all concentrations are more than an order of magnitude below the standards listed in the ICDF Landfill WAC. The exception is thallium, where all three samples from the north soil stockpile and one sample from the south stockpile slightly exceeded the concentration standard of 4.3 mg/kg for the ICDF landfill WAC (Table 5-8).

Table 5-6. Maximum concentrations of organic constituents detected in the soil stockpiles (CPP-97).

| Constituent | Concentration (mg/kg) | LDR Limit (mg/kg) | ICDF WAC (mg/kg) | Sample Number | Location | Validation Qualifier |
|--------------------------------|--------------------------|----------------------|---------------------|---------------|--------------------------|-------------------------|
| 1,4-Dichlorobenzene | 0.0028 | 6 | Not listed | E0130407801AV | North pile, east side | — ^a |
| Acenaphthene | 0.0352 | 3.4 | 21 | E01304075011X | South pile, west side | J |
| Benzo(a)pyrene | 0.0937 | 3.4 | 110 | E01304075011X | South pile, west side | J |
| bis(2-Ethylhexyl) phthalate | 0.42 | Not listed | 150 | E0130407701HN | South pile, east side | J |
| Fluorene | 0.0159 | 3.4 | Not listed | E01304075011X | South pile, west side | J |

Table 5-6. (continued).

| Constituent | Concentration (mg/kg) | LDR Limit (mg/kg) | ICDF WAC (mg/kg) | Sample Number | Location | Validation Qualifier |
|-----------------------------------|--------------------------|----------------------|---------------------|---------------|-----------------------|----------------------|
| Phenol | 0.326 | 6.2 | 80 | E0130407801HN | North pile, east side | J |
| Phosphorous acid, triphenyl ester | 0.6 | Not listed | Not listed | E0130407801HN | North pile, east side | — |
| Triphenyl phosphate | 0.423 | Not listed | Not listed | E0130407702HN | South pile, east side | — |

a. “—” = no validation qualifier.

Table 5-7. Maximum concentrations of TCLP metals detected in the soil stockpiles (CPP-97).

| Constituent | Concentration (mg/L) | LDR Limit (mg/L) | Sample Number | Location | Validation Qualifier |
|-------------|-------------------------|---------------------|---------------|-----------------------|----------------------|
| Barium | 1.21 | 21 | E0130407801VY | North pile, east side | — ^a |
| Cadmium | 0.01 | 0.11 | E0130407801VY | North pile, east side | — |
| Chromium | 0.01 | 0.6 | E0130407801VY | North pile, east side | — |
| Lead | 0.03 | 0.75 | E0130407801VY | North pile, east side | — |
| Zinc | 0.165 | 4.3 | E0130407901VY | North pile, west side | — |

a. “—” = no validation qualifier.

Table 5-8. Maximum concentrations of total metals detected in the soil stockpiles (CPP-97).

| Constituent | Concentration (mg/kg) | ICDF WAC (mg/kg) | Sample Number | Location | Validation Qualifier |
|-------------|--------------------------|---------------------|---------------|------------------------|----------------------|
| Aluminum | 10,220 | 160,000 | E0130407801LM | North pile, east side | — ^a |
| Arsenic | 6.2 | 58 | E0130407901LM | North pile, west side | — |
| Barium | 159 | 3,000 | E0130407801LM | North pile, east side | — |
| Beryllium | 0.718 | 18 | E0130407801LM | North pile, east side | — |
| Cadmium | 0.201 | 3,600 | E0130407901LM | North pile, west side | — |
| Chromium | 32.5 | 41,000 | E0130407801LM | North pile, east side | J |
| Cobalt | 5.35 | 110 | E0130407801LM | North pile, east side | — |
| Copper | 16 | 30,000 | E0130407801LM | North pile, east side | — |
| Iron | 14,790 | 240,000 | E0130407801LM | North pile, east side | — |
| Lead | 10.6 | 58,000 | E0130408001LM | North pile, south side | — |
| Magnesium | 5,310 | 120,000 | E0130407801LM | North pile, east side | — |
| Manganese | 238 | 4,900 | E0130407801LM | North pile, east side | — |
| Mercury | 0.0732 | 9,500 | E0130407901LM | North pile, west side | — |
| Nickel | 22 | 350 | E0130407501LM | South pile, west side | — |

Table 5-8. (continued).

| Constituent | Concentration (mg/kg) | ICDF WAC (mg/kg) | Sample Number | Location | Validation Qualifier |
|-----------------|--------------------------|---------------------|----------------------|-------------------------------|-------------------------|
| Potassium | 2,600 | 43,000 | E0130407501LM | South pile, west side | — |
| Selenium | 0.65 | 850 | E0130407801LM | North pile, east side | — |
| Silver | 0.184 | 9,800 | E0130407501LM | South pile, west side | — |
| Sodium | 351 | 3,200 | E0130407801LM | North pile, east side | — |
| Thallium | 5.65 | 4.3 | E0130407801LM | North pile, east side | — |
| Thallium | 4.68 | 4.3 | E0130407901LM | North pile, west side | — |
| Thallium | 4.32 | 4.3 | E0130408001LM | North pile, south side | — |
| Thallium | 5.11 | 4.3 | E0130407501LM | South pile, west side | — |
| Thallium | 3.93 | 4.3 | E0130407601LM | South pile, south side | — |
| Thallium | 3.52 | 4.3 | E0130407701LM | South pile, east side | — |
| Thallium | 3.08 | 4.3 | E0130407702LM | South pile, east side | — |
| Vanadium | 41.8 | 450 | E0130407701LM | South pile, east side | — |
| Zinc | 78.4 | 210,000 | E0130407501LM | South pile, west side | J |

a. “—” = no validation qualifier.

Note: For comparisons, all thallium results are listed. **Bold** values indicate exceedance of ICDF WAC.

5.2.3 Radiochemistry Results for CPP-97

Radiochemistry results (other than I-129) were compared to Table 3-3 of the ICDF Landfill WAC (DOE-ID 2004c). Maximum concentrations for radiological constituents detected in soil stockpiles are listed in Table 5-9. The highlight for the radiochemistry data is

- All positively identified radiochemical analytes are several orders of magnitude less than the standards listed in the ICDF Landfill WAC.

5.2.4 I-129 Results for CPP-97

Six grab samples (plus one duplicate) were initially analyzed for I-129 at CPP-97. While I-129 was not positively detected, three of the I-129 results did not meet the DQO MDA of 1.0 pCi/g and were flagged “UJ” in the L&V report. The elevated MDAs were due to isotopic interference (high background) attributed to other radioisotopes (e.g., Cs-137 and Sr-90) in the sample. The I-129 results from the south stockpile (plus one duplicate) were flagged as “U” (not detected) with MDAs ranging from 0.71 to 0.95 pCi/g. The MDAs for the north pile ranged from 4.35 to 5.22 pCi/g.

Because of the uncertainty associated with the I-129 results, a corrective action was taken to reanalyze three I-129 samples. Discussions of the corrective action, the analytical methods, and the subsequent validation approach are provided in Section 4.3 and Section 5.1.4 of this report. As was the case for CPP-92/-98/-99, results from the reanalysis provide supportive evidence that the “UJ”-flagged data from the first analyses are also statistical nondetects and that I-129 is not truly present (Table 5-10). The results from the reanalysis, combined with the absence of a positive detection of I-129 in any sample, provide sufficient confirmation that the soils meet the ICDF WAC for I-129. A complete listing of the I-129 results for CPP-97 is provided in Appendix C.

Table 5-9. Maximum concentrations for radiological constituents detected in the soil stockpiles (CPP-97).

| Constituent | Concentration (pCi/kg) | ICDF WAC (pCi/kg) | Sample Number | Location | Validation Qualifier |
|-------------------|---------------------------|----------------------|---------------|------------------------|----------------------|
| Americium-241 | 5.0E-03 | 1.0E+07 | E0130407801RH | North pile, east side | — ^a |
| Cesium-137 | 3.8E+00 | 2.3E+12 | E0130407901RH | North pile, west side | — |
| Cobalt-60 | 3.9E-04 | 1.9E+08 | E0130407801RH | North pile, east side | — |
| Europium-154 | 1.9E-03 | 8.2E+08 | E0130407901RH | North pile, west side | — |
| Plutonium-238 | 4.8E-02 | 1.0E+07 | E0130407901RH | North pile, west side | — |
| Plutonium-239/240 | 4.2E-02 | 1.5E+06 | E0130407801RH | North pile, east side | — |
| Radium-226 | 1.1E-03 | 4.7E+05 | E0130407501RH | South pile, west side | — |
| Strontium-90 | 7.2E+00 | 3.5E+12 | E0130407801RH | North pile, east side | — |
| Technetium-99 | 2.4E-02 | 5.8E+06 | E0130407801RH | North pile, east side | J |
| Thorium-228 | 1.8E-03 | 1.6E+04 | E0130407601RH | South pile, south side | J |
| Thorium-230 | 2.5E-03 | 1.6E+04 | E0130407601RH | South pile, south side | J |
| Thorium-232 | 1.6E-03 | 1.6E+04 | E0130407901RH | North pile, west side | — |
| Uranium-233/234 | 1.4E-03 | 6.0E+06 | E0130408001RH | North Pile, south side | — |
| Uranium-235 | 1.9E-04 | 1.1E+05 | E0130407901RH | North pile, west side | — |
| Uranium-238 | 1.0E-03 | 1.1E+05 | E0130407501RH | South pile, west side | — |

a. “—” = no validation qualifier.

Table 5-10. Comparison of I-129 results from two analytical methods for Site CPP-97.

| Sample ID | Location | First Analyses (No Separation) | | | Second Analyses (Using Separation) | | |
|---------------|----------------------|--------------------------------|----------------|------------------------|------------------------------------|----------------|------------------------|
| | | Conc. (pCi/g) | MDA (pCi/g) | Uncertainty (pCi/g) | Conc. (pCi/g) | MDA (pCi/g) | Uncertainty (pCi/g) |
| E0130407901RI | 97-5 North stockpile | 45.8 UJ | 4.7 | 2.0 | 0.05 U | 0.45 | 0.13 |

5.3 Data Quality Assessment

Data quality indicators are used to assess the success of the project to collect data that can be used to address DQO decisions statements. Detailed descriptions of data quality indicators can be found in the Characterization Plan (DOE-ID 2004a) and QAPjP (DOE-ID 2004d). The data quality indicators assessed below are

- Precision
- Accuracy
- Representativeness
- Completeness
- Comparability.

5.3.1 Precision

Precision is a measure of agreement or reproducibility of repeated measurements for the same property under the same conditions. Precision for duplicate samples is expressed as relative percent difference (RPD) and is defined as the absolute value of the difference divided by the mean of the individual measurements.

5.3.1.1 Laboratory Precision. Laboratory precision for VOCs and SVOCs was assessed from two sets of matrix spike and matrix spike duplicate (MS/MSD) samples collected in the field. The L&V reports and MS/MSD results for SVOCs indicate that all recoveries and RPD values were within quality control (QC) limits. The L&V reports and MS/MSD results for VOCs also indicate that all recoveries and RPD values were within QC limits.

Laboratory precision for applicable inorganic analytes were assessed using MS/MSDs prepared in the laboratory. No systematic precision problems with the laboratory inorganic data were observed. Specific laboratory precision measurements and associated data flagging for inorganic results are detailed in the associated L&V reports.

Laboratory precision measurements for radiochemistry were made using sample splits prepared in the laboratory. No systematic precision problems with the laboratory radiochemistry data were observed. The laboratory precision results and associated data flagging for radiochemical results are detailed in the associated L&V reports.

5.3.1.2 Field Precision. Field precision was assessed by collecting three sets of duplicate samples: Level 2 soil, Level 3 soil, and the south soil stockpile. Fifty-three sets of paired sampled results were compared by calculating the RPD (R-, U-, UJ-, and J-flagged results are not included in the field precision analysis). Of the 53 paired comparisons, 40 had RPDs of less than 30%; that is, there was less than a 30% relative difference for >75% of the duplicate samples. The remaining RPD measurements ranged from between 33 to 127%. The results for the duplicate measurements are in Appendix D.

5.3.2 Accuracy

Accuracy is the relative agreement (or nonagreement) between a measured value and an accepted reference value. Accuracy is assessed by means of determining analyte recovery from MSs, samples, or laboratory reference samples and is expressed as a percent recovery (%R), defined as the measured value divided by the true value expressed as a percent.

5.3.2.1 Laboratory Accuracy. For organic analyses, some analytes originally reported by the laboratory as nondetect, “U,” were qualified as reject, “R,” because the initial/continuing calibration response factors were below the 0.05 QC criteria. Organic analytes affected by the calibration problem were 1,4-dioxane, 4-nitroquinoline-1-oxide, acetonitrile, acrolein, aramite, benzo(k)fluoranthene, hexachlorophene, isobutyl alcohol, and propionitrile. Because these organic analytes are not expected to be present in the waste stream based on historical information, the rejected data will not prevent the completion of the waste profile for ICDF.

There were no systematic problems identified for the inorganic results that resulted in data being rejected. There were some instances of low MS recoveries and positive blank detections being qualified as “J” and “UJ” (e.g., antimony: 9 out 25 qualified “J”; 16 out of 25 qualified “UJ”; barium: 18 out of 25 qualified “J”). Detailed information regarding validation flags for the inorganic data can be found in the L&V reports.

5.3.2.2 I-129 Accuracy. Samples were initially analyzed for I-129 using low-energy photon spectrometry. Nearly 70% of the I-129 results did not meet the MDA of 1.0 pCi/g. While the L&V report stated that I-129 “UJ”-flagged data are “not considered to be truly present in the samples,” it also states that “the use of the results is strongly discouraged.” The remaining 30% of the I-129 data (23 samples) were flagged as “U” (not detected).

Without additional analyses, the usability of the I-129 data was limited to stating that if I-129 were truly present in the “UJ”-flagged data, the concentration was less than or equal to the reported MDA for the corresponding sample. Because of the uncertainty of the results associated with the first analytical method, three samples with high MDAs were reanalyzed using an analytical method that separates out other interfering radionuclides. The results for all three samples were requalified to “U” as statistical nondetects and provide supportive evidence that the UJ-flagged data from the first analysis are also statistical nondetects and that I-129 is not truly present.

5.3.2.3 Field Accuracy. Sources of field inaccuracy are sampling preservation and handling, field contamination, and the sample matrix. The sampling locations and methods described in the Characterization Plan were designed to be representative of the media being sampled.

Sampling accuracy can be assessed by evaluating the results of field blanks, equipment rinsates, and/or trip blanks. For this project, a field blank sample was collected during Level 1 sampling, handled and shipped with other samples, and analyzed for radiochemical constituents. All field blank results were nondetects, indicating there was no cross-contamination during sample collection and shipment. Because dedicated and disposable sampling equipment was used for the Level 1, Level 2, Level 3 boxes and each soil stockpile, equipment rinsates were not required.

5.3.3 Completeness

Completeness is the measure of the amount of valid analytical data obtained compared to the total number of data points planned. A completeness of 90% is a common goal. The completeness goal of the Characterization Plan (DOE-ID 2004a) was to obtain enough valid data to satisfy the DQO specifications. Valid analytical data are those that meet the project DQOs. Data that are flagged (qualified) during the validation process are not necessarily invalid data. The definition of “valid data” in the context of calculating completeness is “data that are acceptable for their intended purpose.”

The project achieved a >90% completeness of valid data as compared to the *total* number of data points planned. Approximately 5% of the laboratory data was rejected (R-flagged), and approximately 5% of the laboratory data was flagged as “estimated” (UJ- or J-flagged). However, most UJ- and J-flagged data can be used for waste disposal determinations.

5.3.4 Comparability

Comparability is the degree to which one data set can be compared to another data set that is obtained from the same population using similar techniques for data gathering. Through the use of consistent sampling procedures, comparable analytical methodologies, standard field and laboratory documentation, and traceable laboratory standards, the data collected from this characterization are comparable to other soil characterizations.

The analytical methods and detection limits selected for this project were in accordance with ER-SOW-394 and meet the data quality requirements set forth in the Characterization Plan. Specific data limitations and validation qualifiers are detailed in the L&V reports.

5.3.5 Representativeness

Representativeness is a qualitative measure of the degree to which data accurately and precisely represent a characteristic of a population parameter at a sampling point, a process condition, or an environmental condition. The implementation of the sampling design and methodologies outlined in Characterization Plan (DOE-ID 2004a) provided a sufficient level of sample representativeness for the project.

5.3.6 Field Assessment/Project Deviations

The changes, deviations, or modifications made between the preparation of the Characterization Plan (DOE-ID 2004a) and its execution are described below:

- An additional Level 3 (>50 mR/hr) was added to the Level 3 inventory, increasing the number of Level 3 boxes from three to four. The additional box was included in the composite sample collected to characterize the Level 3 boxes. The consequence of increasing the number of boxes to be represented by a composite sample (and duplicate) is a potential increase in the variance of the true mean.
- The actual number of Level 1 and Level 2 boxes associated with CPP-92 and CPP-99 differed slightly from the Characterization Plan. This difference in numbers did not result in a change to the number of boxes sampled or to the sampling strategy.
- The Characterization Plan states that, of the 59 I-129 samples to be collected, 56 would come from Level 1 and Level 2 and the three would come from Level 3 boxes. Because an additional box was added to Level 3, 55 of the I-129 samples were collected from the Level 1 and Level 2 boxes and four were collected from the Level 3 boxes (for a total of 59 I-129 samples).
- As part of a corrective action, three I-129 samples were submitted for reanalysis using a second analytical method that used a radiochemical separation step to isolate I-129. This separation step eliminated potential interferences from other analytes and allowed I-129 to be detected with better sensitivity by low-energy photon spectrometry.

6. SUMMARY

Samples were collected to characterize the CPP-92/-98/-99 boxed soils and the CPP-97 soil stockpiles. The organic and inorganic sample results from both sites meet the UTS as specified in 40 CFR 268.48. Other than thallium at CPP-97, the organic, inorganic, and radiochemistry (other than I-129) data from both CPP-92/-98/-99 and CPP-97 meet the concentration guidelines of the ICDF WAC.

Two analytical methods were used for I-129 analysis. The first method did not consistently meet the DQO MDA of 1.0 pCi/g due to interfering isotopes. Three samples with high MDAs were reanalyzed using a method that removed the interferences. Results for the three samples were reclassified to “U” as statistical nondetects. The data provide supportive evidence that the UJ-flagged data from the first analysis are also statistical nondetects and that I-129 is not truly present. The results from the reanalysis, combined with the absence of a positive detection of I-129 in any sample, provide sufficient confirmation that the soils and debris from Remediation Set 1 meet the ICDF WAC for I-129.

7. REFERENCES

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Appendix A

**Operable Unit 3-13, Group 3,
Other Surface Soils Remediation Set 1 (Phase 1)
Identification Numbers and Radiation Levels for
Level 1, Level 2, and Level 3 Soil Boxes**

Appendix A
Operable Unit 3-13, Group 3,
Other Surface Soils Remediation Set 1 (Phase 1)
Identification Numbers and Radiation Levels for
Level 1, Level 2, and Level 3 Soil Boxes

Table A-1. Level 1 boxes sampled for waste profiles.

| Sample ID | Box X - Y | Box ID | mR/hr | Box ID | mR/hr |
|-----------|-------------|--------|-------|--------|-------|
| E01304000 | Box 1 - 2 | 94-370 | 0.1 | 15431K | 0.1 |
| E01304001 | Box 3 - 4 | 94-074 | 1.0 | 15455K | 1.0 |
| E01304002 | Box 5 - 6 | 92-155 | 1.0 | 92-065 | 1.0 |
| E01304003 | Box 7 - 8 | 92-063 | 0.5 | 94-075 | 0.5 |
| E01304004 | Box 9 - 10 | PT-8 | 0.5 | 94-424 | 0.5 |
| E01304005 | Box 11 - 12 | 15460K | 0.1 | 94-457 | 0.5 |
| E01304006 | Box 13 - 14 | 94-274 | 1.0 | 94-567 | 1.0 |
| E01304007 | Box 15 - 16 | 94-353 | 1.0 | 94-414 | 1.0 |
| E01304008 | Box 17 - 18 | 94-345 | 2.0 | 94-543 | 2.0 |
| E01304009 | Box 19 - 20 | 15408K | 3.0 | 94-401 | 2.0 |
| E01304010 | Box 21 - 22 | 15410K | 2.0 | 94-505 | 1.0 |
| E01304011 | Box 23 - 24 | 15364K | 1.0 | 15365K | 0.5 |

Table A-2. Level 2 boxes sampled for waste profiles.

| Sample ID | Box X - Y | Box ID | mR/hr | Box ID | mR/hr |
|-----------|-----------|--------|-------|--------|-------|
| E01304012 | Box 1 - 2 | 94-339 | 10 | 94-233 | 10 |
| E01304013 | Box 3 - 4 | 94-357 | 15 | 95-221 | 40 |
| E01304014 | Box 5 - 6 | 94-293 | 10 | 94-308 | 10 |

Table A-3. Level 3 boxes sampled for waste profiles.

| Sample ID | Box X | Box ID | mR/hr |
|-----------|-------|--------|-------|
| E01304015 | Box 1 | 94-267 | 80 |
| E01304015 | Box 2 | 94-557 | 200 |
| E01304015 | Box 3 | 94-544 | 100 |
| E01304015 | Box 4 | 94-552 | 300 |

Table A-4. Level 1 boxes sampled for iodine-129.

| Level 1 Iodine-129 | Box X | Box ID | mR/hr |
|--------------------|--------|--------|-------|
| E01304016 | Box 1 | 94-370 | 0.1 |
| E01304017 | Box 2 | 15431K | 0.1 |
| E01304018 | Box 3 | 94-074 | 1.0 |
| E01304019 | Box 4 | 15455K | 1.0 |
| E01304020 | Box 5 | 92-155 | 1.0 |
| E01304021 | Box 6 | 92-065 | 1.0 |
| E01304022 | Box 7 | 92-063 | 0.5 |
| E01304023 | Box 8 | 94-075 | 0.5 |
| E01304024 | Box 9 | PT-8 | 0.5 |
| E01304025 | Box 10 | 94-424 | 0.5 |
| E01304026 | Box 11 | 15460K | 0.1 |
| E01304027 | Box 12 | 94-457 | 0.5 |
| E01304028 | Box 13 | 94-274 | 1.0 |
| E01304029 | Box 14 | 94-567 | 1.0 |
| E01304030 | Box 15 | 94-353 | 1.0 |
| E01304031 | Box 16 | 94-414 | 1.0 |
| E01304032 | Box 17 | 94-345 | 2.0 |
| E01304033 | Box 18 | 94-543 | 2.0 |
| E01304034 | Box 19 | 15408K | 3.0 |
| E01304035 | Box 20 | 94-401 | 2.0 |
| E01304036 | Box 21 | 15410K | 2.0 |
| E01304037 | Box 22 | 94-505 | 1.0 |
| E01304038 | Box 23 | 15364K | 1.0 |
| E01304039 | Box 24 | 15365K | 0.5 |
| E01304040 | Box 25 | 93-680 | 0.5 |
| E01304041 | Box 26 | 93-678 | 2.0 |
| E01304042 | Box 27 | 15440K | 5.0 |
| E01304043 | Box 28 | 94-048 | 5.0 |
| E01304044 | Box 29 | 15464K | 0.5 |
| E01304045 | Box 30 | 94-405 | 0.5 |
| E01304046 | Box 31 | 94-441 | 1.0 |
| E01304047 | Box 32 | 94-453 | 3.0 |
| E01304048 | Box 33 | 15395K | 5.0 |

Table A-4. (continued).

| Level 1 Iodine-129 | Box X | Box ID | mR/hr |
|--------------------|--------|--------|-------|
| E01304049 | Box 34 | 94-486 | 0.5 |
| E01304050 | Box 35 | 95-226 | 1.0 |
| E01304051 | Box 36 | 15414K | 3.0 |
| E01304052 | Box 37 | 94-069 | 5.0 |
| E01304053 | Box 38 | 94-269 | 5.0 |
| E01304054 | Box 39 | 94-182 | 5.0 |
| E01304055 | Box 40 | 95-200 | 3.0 |
| E01304056 | Box 41 | 94-333 | 5.0 |
| E01304057 | Box 42 | 94-304 | 5.0 |
| E01304058 | Box 43 | 92-076 | 5.0 |

Table A-5. Level 2 boxes sampled for iodine-129.

| Level 2 Iodine-129 | Box X | Box ID | mR/hr |
|--------------------|--------|--------|-------|
| E01304059 | Box 1 | 94-339 | 10 |
| E01304060 | Box 2 | 94-233 | 10 |
| E01304061 | Box 3 | 94-357 | 15 |
| E01304062 | Box 4 | 95-221 | 40 |
| E01304063 | Box 5 | 94-293 | 10 |
| E01304064 | Box 6 | 94-308 | 10 |
| E01304065 | Box 7 | 94-217 | 20 |
| E01304066 | Box 8 | 94-536 | 6.0 |
| E01304067 | Box 9 | 95-205 | 40 |
| E01304068 | Box 10 | 94-046 | 50 |
| E01304069 | Box 11 | 94-351 | 8.0 |
| E01304070 | Box 12 | 94-263 | 15 |

Table A-6. Level 3 boxes sampled for iodine-129.

| Level 3 Iodine-129 | Box X | Box ID | mR/hr |
|--------------------|-------|--------|-------|
| E01304071 | Box 1 | 94-267 | 80 |
| E01304072 | Box 2 | 94-557 | 200 |
| E01304073 | Box 3 | 94-544 | 100 |
| E01304074 | Box 4 | 94-552 | 300 |

Appendix B

Operable Unit 3-13, Group 3, Other Surface Soils Remediation Set 1 (Phase 1) Summary of Detected Analytes

Appendix B
Operable Unit 3-13, Group 3,
Other Surface Soils Remediation Set 1 (Phase 1)
Definitions of Laboratory Qualifiers
and Detected Analytes

Laboratory Qualifiers for Inorganic Compounds

C (concentration) Qualifiers:

- B The reported value was obtained from a reading that was < the Contract Required Detection Limit (CRDL) but \geq to the Instrument Detection Limit (IDL).
- U The analyte was analyzed for but not detected.

Analysis Qualifiers (Q):

- E The reported value is estimated because of the presence of interference.
- M Duplicate injection precision not met.
- N Spiked sample recovery not within control limits.
- S The reported value was determined by the Method of Standard Additions (MSA).
- W Post-digestion spike from Furnace AA analysis is out of control limits (85-115%), while sample absorbance is < 50% of spiked absorbance.
- * Duplicate analysis not within control limits.

Laboratory Qualifiers for Organic Compounds

- U Compound was analyzed for but not detected.
- J The compound was positively identified, but the associated value may not be an accurate representation of the amount actually present.
- N Presumptive evidence of a compound.
- C Result was confirmed by gas chromatograph (GC)/mass spectrometry
- B Analyte was found in the associated blank as well as the sample.
- E Concentration exceeded the calibration range of the instrument.
- D Analysis reported at a secondary dilution factor
- A Tentatively identified compound is suspected of aldol-condensation product.

- P Pesticide/PCB analyte had a > 25% difference between two GC columns.
- M Analyte was quantified using a calibration curve constructed using a first or higher order regression fit.
- X Used to describe other results.

Definitions of Validation Qualifiers

Inorganic Validation Qualifiers

- U Detected at or above the applicable detection limit. However, the value was less than 5 times the highest positive amount in any laboratory blank.
- UJ Not detected. The associated value is an estimate and may be inaccurate or imprecise.
- J Detected at or above the applicable detection limit. The associated value is an estimate and may be inaccurate or imprecise.
- R Data not recommended for use.

Organic Validation Qualifiers

- A Accept data, but qualify positive results as non-detect due to method blank contamination.
- R Reject data, reject non-detect results.
- J Accept data, but qualify positive results < the Contract Required Quantitation Limit as estimated.

Radiological Validation Qualifiers

- U The radionuclide is not considered to be present in the sample.
- UJ The radionuclide may or may not be present and the result is considered highly questionable.
- J The radionuclide is considered to be present; however, the result may not be an accurate representation of the amount of activity actually present.
- R The radionuclide may or may not be present, and the result is known to be inaccurate or imprecise.

Table B-1. Level 1 – Detected organic compounds.

| Sample Number | Constituent | CAS | Concentration (mg/kg) | LDR Limit (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|---------------------|----------|--------------------------|-------------------------|---------------------|------------------|-------------------------|
| E0130400001AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0012 | 6 | 44 | | |
| E0130400101AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0014 | 6 | 44 | | |
| E0130400201AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0011 | 6 | 44 | | |
| E0130400301AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0018 | 6 | 44 | | |
| E0130400401AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0017 | 6 | 44 | | J |
| E0130400501AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0013 | 6 | 44 | | |
| E0130400601AZ | 1,4-Dichlorobenzene | 106-46-7 | 0.0019 | 6 | 44 | | |
| E0130400701AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0014 | 6 | 44 | | |
| E0130400801AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0011 | 6 | 44 | | |
| E0130400901AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0015 | 6 | 44 | | |
| E0130401001AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0018 | 6 | 44 | | |
| E0130401101AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0015 | 6 | 44 | | |
| E0130400401AV | Acetone | 67-64-1 | 0.0215 | 160 | 49 | | J |
| E0130400001AV | Methylene chloride | 75-09-2 | 0.0016 | 30 | 27 | J | J |
| E0130400101AV | Methylene chloride | 75-09-2 | 0.0017 | 30 | 27 | J | J |
| E0130400201AV | Methylene chloride | 75-09-2 | 0.0015 | 30 | 27 | J | J |
| E0130400401AV | Methylene chloride | 75-09-2 | 0.0022 | 30 | 27 | J | J |

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|--------------|------------|--------------------------|---------------------|---------------|-------------------------|
| E0130400001PC | Aroclor-1254 | 11097-69-1 | 0.202 | 130 | | |
| E0130400101PB | Aroclor-1254 | 11097-69-1 | 0.0176 | 130 | | |
| E0130400201PC | Aroclor-1254 | 11097-69-1 | 0.0449 | 130 | | |
| E0130400301PC | Aroclor-1254 | 11097-69-1 | 0.0519 | 130 | J | |
| E0130400401PC | Aroclor-1254 | 11097-69-1 | 0.0093 | 130 | J | |
| E0130400501PC | Aroclor-1254 | 11097-69-1 | 0.0601 | 130 | | |
| E0130400601PC | Aroclor-1254 | 11097-69-1 | 0.0355 | 130 | | |
| E0130400701PC | Aroclor-1254 | 11097-69-1 | 0.0043 | 130 | J | |
| E0130400801PC | Aroclor-1254 | 11097-69-1 | 0.0059 | 130 | J | J |
| E0130400901PC | Aroclor-1254 | 11097-69-1 | 0.0082 | 130 | J | J |
| E0130401001PC | Aroclor-1254 | 11097-69-1 | 0.0132 | 130 | | |
| E0130401101PC | Aroclor-1254 | 11097-69-1 | 0.0123 | 130 | | |
| E0130400101PB | Aroclor-1260 | 11096-82-5 | 0.0076 | 500 | J | |
| E0130400201PC | Aroclor-1260 | 11096-82-5 | 0.0083 | 500 | JP | |
| E0130400501PC | Aroclor-1260 | 11096-82-5 | 0.0092 | 500 | JP | |
| E0130400601PC | Aroclor-1260 | 11096-82-5 | 0.0187 | 500 | | |
| E0130400801PC | Aroclor-1260 | 11096-82-5 | 0.0034 | 500 | J | J |
| E0130400901PC | Aroclor-1260 | 11096-82-5 | 0.0071 | 500 | J | J |
| E0130401001PC | Aroclor-1260 | 11096-82-5 | 0.0102 | 500 | J | J |
| E0130401101PC | Aroclor-1260 | 11096-82-5 | 0.0089 | 500 | J | J |

Table B-2. Level 1 – Detected TCLP metals.

| Sample Number | Constituent | CAS | Concentration (mg/L) | LDR Limit (mg/L) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|-------------------------|---------------------|---------------|-------------------------|
| E0130400001VY | Antimony | 7440-36-0 | 0.04 | 1.15 | B | |
| E0130400801VY | Antimony | 7440-36-0 | 0.057 | 1.15 | B | |
| E0130400001VY | Arsenic | 7440-38-2 | 0.03 | 5 | B | |
| E0130400201VY | Arsenic | 7440-38-2 | 0.034 | 5 | B | |
| E0130400501VY | Arsenic | 7440-38-2 | 0.039 | 5 | B | |
| E0130401101VY | Arsenic | 7440-38-2 | 0.024 | 5 | B | |
| E0130400001VY | Barium | 7440-39-3 | 0.787 | 21 | B | |
| E0130400101VY | Barium | 7440-39-3 | 0.888 | 21 | B | |
| E0130400201VY | Barium | 7440-39-3 | 0.97 | 21 | B | |
| E0130400301VY | Barium | 7440-39-3 | 0.827 | 21 | B | |
| E0130400401VY | Barium | 7440-39-3 | 0.417 | 21 | B | |
| E0130400501VY | Barium | 7440-39-3 | 0.733 | 21 | B | |
| E0130400601VY | Barium | 7440-39-3 | 0.949 | 21 | B | |
| E0130400701VY | Barium | 7440-39-3 | 0.897 | 21 | B | |
| E0130400801VY | Barium | 7440-39-3 | 0.824 | 21 | B | |
| E0130400901VY | Barium | 7440-39-3 | 0.694 | 21 | B | |
| E0130401001VY | Barium | 7440-39-3 | 0.901 | 21 | B | |
| E0130401101VY | Barium | 7440-39-3 | 0.633 | 21 | B | |
| E0130400501VY | Beryllium | 7440-41-7 | 0.006 | 1.22 | B | |
| E0130400801VY | Beryllium | 7440-41-7 | 0.004 | 1.22 | B | |
| E0130400001VY | Chromium | 7440-47-3 | 0.018 | 0.6 | B | |
| E0130400101VY | Chromium | 7440-47-3 | 0.009 | 0.6 | B | |
| E0130400201VY | Chromium | 7440-47-3 | 0.009 | 0.6 | B | |
| E0130400401VY | Chromium | 7440-47-3 | 0.029 | 0.6 | B | |
| E0130400601VY | Lead | 7439-92-1 | 0.037 | 0.75 | B | |
| E0130400801VY | Lead | 7439-92-1 | 0.033 | 0.75 | B | |
| E0130400601VY | Mercury | 7439-97-6 | 0.0171 | 0.025 | | |
| E0130400301VY | Nickel | 7440-02-0 | 0.016 | 11 | B | |
| E0130400501VY | Nickel | 7440-02-0 | 0.024 | 11 | B | |
| E0130400801VY | Nickel | 7440-02-0 | 0.016 | 11 | B | |
| E0130400901VY | Nickel | 7440-02-0 | 0.086 | 11 | B | |
| E0130401001VY | Selenium | 7782-49-2 | 0.036 | 5.7 | B | |
| E0130400801VY | Vanadium | 7440-62-2 | 0.01 | 1.6 | B | |
| E0130401001VY | Vanadium | 7440-62-2 | 0.01 | 1.6 | B | |
| E0130400501VY | Zinc | 7440-66-6 | 0.028 | 4.3 | B | |
| E0130400701VY | Zinc | 7440-66-6 | 0.024 | 4.3 | B | |
| E0130400901VY | Zinc | 7440-66-6 | 0.042 | 4.3 | B | |
| E0130401101VY | Zinc | 7440-66-6 | 0.033 | 4.3 | B | |

Table B-3. Level 1 – Detected total metals.

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|---------------|-------------------------|
| E0130400001LM | Aluminum | 7429-90-5 | 7650 | 160000 | | |
| E0130400101LM | Aluminum | 7429-90-5 | 7280 | 160000 | | |
| E0130400201LM | Aluminum | 7429-90-5 | 7620 | 160000 | | |
| E0130400301LM | Aluminum | 7429-90-5 | 7240 | 160000 | | |
| E0130400401LM | Aluminum | 7429-90-5 | 15620 | 160000 | | |
| E0130400501LM | Aluminum | 7429-90-5 | 7030 | 160000 | | |
| E0130400601LM | Aluminum | 7429-90-5 | 7960 | 160000 | | |
| E0130400701LM | Aluminum | 7429-90-5 | 7860 | 160000 | | |
| E0130400801LM | Aluminum | 7429-90-5 | 8000 | 160000 | * | |
| E0130400901LM | Aluminum | 7429-90-5 | 7250 | 160000 | * | |
| E0130401001LM | Aluminum | 7429-90-5 | 6180 | 160000 | * | |
| E0130401101LM | Aluminum | 7429-90-5 | 6590 | 160000 | * | |
| E0130400001LM | Antimony | 7440-36-0 | 0.996 | 5800 | BN | J |
| E0130400101LM | Antimony | 7440-36-0 | 0.665 | 5800 | BN | J |
| E0130400201LM | Antimony | 7440-36-0 | 0.44 | 5800 | BN | J |
| E0130400301LM | Antimony | 7440-36-0 | 0.756 | 5800 | BN | J |
| E0130400401LM | Antimony | 7440-36-0 | 1.3 | 5800 | N | J |
| E0130400501LM | Antimony | 7440-36-0 | 0.654 | 5800 | BN | J |
| E0130400601LM | Antimony | 7440-36-0 | 0.994 | 5800 | BN | J |
| E0130400901LM | Antimony | 7440-36-0 | 0.395 | 5800 | BN | J |
| E0130400001LM | Arsenic | 7440-38-2 | 6.67 | 58 | * | |
| E0130400101LM | Arsenic | 7440-38-2 | 6.25 | 58 | * | |
| E0130400201LM | Arsenic | 7440-38-2 | 5.42 | 58 | * | |
| E0130400301LM | Arsenic | 7440-38-2 | 5.48 | 58 | * | |
| E0130400401LM | Arsenic | 7440-38-2 | 6.26 | 58 | * | |
| E0130400501LM | Arsenic | 7440-38-2 | 6.51 | 58 | * | |
| E0130400601LM | Arsenic | 7440-38-2 | 8.43 | 58 | * | |
| E0130400701LM | Arsenic | 7440-38-2 | 10.1 | 58 | * | |
| E0130400801LM | Arsenic | 7440-38-2 | 6.14 | 58 | | |
| E0130400901LM | Arsenic | 7440-38-2 | 6.64 | 58 | | |
| E0130401001LM | Arsenic | 7440-38-2 | 5.18 | 58 | | |
| E0130401101LM | Arsenic | 7440-38-2 | 5.78 | 58 | | |
| E0130400001LM | Barium | 7440-39-3 | 138 | 3000 | N | J |
| E0130400101LM | Barium | 7440-39-3 | 117 | 3000 | N | J |
| E0130400201LM | Barium | 7440-39-3 | 116 | 3000 | N | J |
| E0130400301LM | Barium | 7440-39-3 | 111 | 3000 | N | J |
| E0130400401LM | Barium | 7440-39-3 | 125 | 3000 | N | J |
| E0130400501LM | Barium | 7440-39-3 | 106 | 3000 | N | J |
| E0130400601LM | Barium | 7440-39-3 | 124 | 3000 | N | J |
| E0130400701LM | Barium | 7440-39-3 | 128 | 3000 | N | J |
| E0130400801LM | Barium | 7440-39-3 | 180 | 3000 | *N | J |
| E0130400901LM | Barium | 7440-39-3 | 112 | 3000 | N* | J |
| E0130401001LM | Barium | 7440-39-3 | 105 | 3000 | *N | J |
| E0130401101LM | Barium | 7440-39-3 | 83.9 | 3000 | *N | J |

Table B-3. (continued).

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|---------------|-------------------------|
| E0130400001LM | Beryllium | 7440-41-7 | 0.492 | 18 | B | |
| E0130400101LM | Beryllium | 7440-41-7 | 0.444 | 18 | B | |
| E0130400201LM | Beryllium | 7440-41-7 | 0.451 | 18 | B | |
| E0130400301LM | Beryllium | 7440-41-7 | 0.454 | 18 | B | |
| E0130400401LM | Beryllium | 7440-41-7 | 0.55 | 18 | B | |
| E0130400501LM | Beryllium | 7440-41-7 | 0.442 | 18 | B | |
| E0130400601LM | Beryllium | 7440-41-7 | 0.48 | 18 | B | |
| E0130400701LM | Beryllium | 7440-41-7 | 0.5 | 18 | B | |
| E0130400801LM | Beryllium | 7440-41-7 | 0.469 | 18 | B | |
| E0130400901LM | Beryllium | 7440-41-7 | 0.444 | 18 | B | |
| E0130401001LM | Beryllium | 7440-41-7 | 0.415 | 18 | B | |
| E0130401101LM | Beryllium | 7440-41-7 | 0.433 | 18 | B | |
| E0130400001LM | Cadmium | 7440-43-9 | 0.296 | 3600 | B | |
| E0130400101LM | Cadmium | 7440-43-9 | 0.267 | 3600 | B | |
| E0130400201LM | Cadmium | 7440-43-9 | 0.263 | 3600 | B | |
| E0130400301LM | Cadmium | 7440-43-9 | 0.29 | 3600 | B | |
| E0130400401LM | Cadmium | 7440-43-9 | 0.127 | 3600 | B | |
| E0130400501LM | Cadmium | 7440-43-9 | 0.383 | 3600 | B | |
| E0130400601LM | Cadmium | 7440-43-9 | 0.376 | 3600 | B | |
| E0130400701LM | Cadmium | 7440-43-9 | 0.285 | 3600 | B | |
| E0130400801LM | Cadmium | 7440-43-9 | 0.659 | 3600 | | |
| E0130401001LM | Cadmium | 7440-43-9 | 0.408 | 3600 | B | |
| E0130400001LM | Calcium | 7440-70-2 | 19900 | No Limit | * | |
| E0130400101LM | Calcium | 7440-70-2 | 15750 | No Limit | * | |
| E0130400201LM | Calcium | 7440-70-2 | 19060 | No Limit | * | |
| E0130400301LM | Calcium | 7440-70-2 | 17750 | No Limit | * | |
| E0130400401LM | Calcium | 7440-70-2 | 56920 | No Limit | * | |
| E0130400501LM | Calcium | 7440-70-2 | 41120 | No Limit | * | |
| E0130400601LM | Calcium | 7440-70-2 | 20210 | No Limit | * | |
| E0130400701LM | Calcium | 7440-70-2 | 15100 | No Limit | * | |
| E0130400801LM | Calcium | 7440-70-2 | 13000 | No Limit | * | J |
| E0130401001LM | Calcium | 7440-70-2 | 100840 | No Limit | * | J |
| E0130401101LM | Calcium | 7440-70-2 | 25860 | No Limit | * | J |
| E0130400001LM | Chromium | 7440-47-3 | 21.5 | 41000 | * | |
| E0130400101LM | Chromium | 7440-47-3 | 21.3 | 41000 | * | |
| E0130400201LM | Chromium | 7440-47-3 | 19.4 | 41000 | * | |
| E0130400301LM | Chromium | 7440-47-3 | 19.8 | 41000 | * | |
| E0130400401LM | Chromium | 7440-47-3 | 28.6 | 41000 | * | |
| E0130400501LM | Chromium | 7440-47-3 | 22.2 | 41000 | * | |
| E0130400601LM | Chromium | 7440-47-3 | 25.1 | 41000 | * | |
| E0130400701LM | Chromium | 7440-47-3 | 27.8 | 41000 | * | |
| E0130400801LM | Chromium | 7440-47-3 | 19 | 41000 | | |
| E0130400901LM | Chromium | 7440-47-3 | 20.4 | 41000 | * | J |
| E0130401001LM | Chromium | 7440-47-3 | 21.7 | 41000 | | |
| E0130401101LM | Chromium | 7440-47-3 | 22.8 | 41000 | | |

Table B-3. (continued).

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|---------------|-------------------------|
| E0130400001LM | Cobalt | 7440-48-4 | 4.76 | 100 | | |
| E0130400101LM | Cobalt | 7440-48-4 | 4.57 | 100 | | |
| E0130400201LM | Cobalt | 7440-48-4 | 5.14 | 100 | | |
| E0130400301LM | Cobalt | 7440-48-4 | 4.77 | 100 | | |
| E0130400401LM | Cobalt | 7440-48-4 | 14.4 | 100 | | |
| E0130400501LM | Cobalt | 7440-48-4 | 5.36 | 100 | | |
| E0130400601LM | Cobalt | 7440-48-4 | 4.68 | 100 | | |
| E0130400701LM | Cobalt | 7440-48-4 | 5.82 | 100 | | |
| E0130400901LM | Cobalt | 7440-48-4 | 4.17 | 100 | | |
| E0130400001LM | Copper | 7440-50-8 | 14.4 | 30000 | | |
| E0130400101LM | Copper | 7440-50-8 | 14 | 30000 | | |
| E0130400201LM | Copper | 7440-50-8 | 15.5 | 30000 | | |
| E0130400301LM | Copper | 7440-50-8 | 14.4 | 30000 | | |
| E0130400401LM | Copper | 7440-50-8 | 22.4 | 30000 | | |
| E0130400501LM | Copper | 7440-50-8 | 14.7 | 30000 | | |
| E0130400601LM | Copper | 7440-50-8 | 14.4 | 30000 | | |
| E0130400701LM | Copper | 7440-50-8 | 15.6 | 30000 | | |
| E0130400801LM | Copper | 7440-50-8 | 17.9 | 30000 | * | |
| E0130400901LM | Copper | 7440-50-8 | 12.8 | 30000 | | |
| E0130401001LM | Copper | 7440-50-8 | 12.2 | 30000 | * | |
| E0130401101LM | Copper | 7440-50-8 | 12.3 | 30000 | * | |
| E0130400001LM | Iron | 7439-89-6 | 12550 | 240000 | | |
| E0130400101LM | Iron | 7439-89-6 | 12090 | 240000 | | |
| E0130400201LM | Iron | 7439-89-6 | 12960 | 240000 | | |
| E0130400301LM | Iron | 7439-89-6 | 12900 | 240000 | | |
| E0130400401LM | Iron | 7439-89-6 | 27690 | 240000 | | |
| E0130400501LM | Iron | 7439-89-6 | 12210 | 240000 | | |
| E0130400601LM | Iron | 7439-89-6 | 13500 | 240000 | | |
| E0130400701LM | Iron | 7439-89-6 | 13860 | 240000 | | |
| E0130400801LM | Iron | 7439-89-6 | 13770 | 240000 | | |
| E0130400901LM | Iron | 7439-89-6 | 11540 | 240000 | * | J |
| E0130401001LM | Iron | 7439-89-6 | 11410 | 240000 | | |
| E0130401101LM | Iron | 7439-89-6 | 11770 | 240000 | | |
| E0130400001LM | Lead | 7439-92-1 | 9.26 | 58000 | | |
| E0130400101LM | Lead | 7439-92-1 | 8.29 | 58000 | | |
| E0130400201LM | Lead | 7439-92-1 | 7.6 | 58000 | | |
| E0130400301LM | Lead | 7439-92-1 | 9.09 | 58000 | | |
| E0130400401LM | Lead | 7439-92-1 | 7.56 | 58000 | | |
| E0130400501LM | Lead | 7439-92-1 | 7.95 | 58000 | | |
| E0130400601LM | Lead | 7439-92-1 | 8.17 | 58000 | | |
| E0130400701LM | Lead | 7439-92-1 | 9.33 | 58000 | | |
| E0130400901LM | Lead | 7439-92-1 | 8.89 | 58000 | | |
| E0130400001LM | Magnesium | 7439-95-4 | 4790 | 120000 | | |
| E0130400101LM | Magnesium | 7439-95-4 | 4860 | 120000 | | |
| E0130400201LM | Magnesium | 7439-95-4 | 5550 | 120000 | | |

Table B-3. (continued).

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|---------------|-------------------------|
| E0130400301LM | Magnesium | 7439-95-4 | 4680 | 120000 | | |
| E0130400401LM | Magnesium | 7439-95-4 | 13930 | 120000 | | |
| E0130400501LM | Magnesium | 7439-95-4 | 5380 | 120000 | | |
| E0130400601LM | Magnesium | 7439-95-4 | 5190 | 120000 | | |
| E0130400701LM | Magnesium | 7439-95-4 | 5460 | 120000 | | |
| E0130400801LM | Magnesium | 7439-95-4 | 5940 | 120000 | * | J |
| E0130400901LM | Magnesium | 7439-95-4 | 4540 | 120000 | * | J |
| E0130401001LM | Magnesium | 7439-95-4 | 5180 | 120000 | * | J |
| E0130401101LM | Magnesium | 7439-95-4 | 4650 | 120000 | * | J |
| E0130400001LM | Manganese | 7439-96-5 | 185 | 4900 | | J |
| E0130400101LM | Manganese | 7439-96-5 | 173 | 4900 | | J |
| E0130400201LM | Manganese | 7439-96-5 | 190 | 4900 | | J |
| E0130400301LM | Manganese | 7439-96-5 | 183 | 4900 | | J |
| E0130400401LM | Manganese | 7439-96-5 | 448 | 4900 | | J |
| E0130400501LM | Manganese | 7439-96-5 | 220 | 4900 | | J |
| E0130400601LM | Manganese | 7439-96-5 | 212 | 4900 | | J |
| E0130400701LM | Manganese | 7439-96-5 | 199 | 4900 | | J |
| E0130400901LM | Manganese | 7439-96-5 | 175 | 4900 | *N | J |
| E0130400001LM | Mercury | 7439-97-6 | 0.0656 | 9500 | | J |
| E0130400101LM | Mercury | 7439-97-6 | 0.0959 | 9500 | | |
| E0130400201LM | Mercury | 7439-97-6 | 0.565 | 9500 | | |
| E0130400301LM | Mercury | 7439-97-6 | 0.204 | 9500 | | |
| E0130400401LM | Mercury | 7439-97-6 | 0.00855 | 9500 | B | J |
| E0130400501LM | Mercury | 7439-97-6 | 0.235 | 9500 | | |
| E0130400601LM | Mercury | 7439-97-6 | 0.0222 | 9500 | | J |
| E0130400701LM | Mercury | 7439-97-6 | 0.0184 | 9500 | | J |
| E0130400001LM | Nickel | 7440-02-0 | 19.8 | 350 | * | |
| E0130400101LM | Nickel | 7440-02-0 | 20 | 350 | * | |
| E0130400201LM | Nickel | 7440-02-0 | 19 | 350 | * | |
| E0130400301LM | Nickel | 7440-02-0 | 18.5 | 350 | * | |
| E0130400401LM | Nickel | 7440-02-0 | 39.5 | 350 | * | |
| E0130400501LM | Nickel | 7440-02-0 | 21.7 | 350 | * | |
| E0130400601LM | Nickel | 7440-02-0 | 20.5 | 350 | * | |
| E0130400701LM | Nickel | 7440-02-0 | 29.3 | 350 | * | |
| E0130400901LM | Nickel | 7440-02-0 | 18.1 | 350 | * | |
| E0130400001LM | Potassium | 7440-09-7 | 1250 | 43000 | N | J |
| E0130400101LM | Potassium | 7440-09-7 | 1170 | 43000 | N | J |
| E0130400201LM | Potassium | 7440-09-7 | 1170 | 43000 | N | J |
| E0130400301LM | Potassium | 7440-09-7 | 1160 | 43000 | N | J |
| E0130400401LM | Potassium | 7440-09-7 | 1490 | 43000 | N | J |
| E0130400501LM | Potassium | 7440-09-7 | 1060 | 43000 | N | J |
| E0130400601LM | Potassium | 7440-09-7 | 1180 | 43000 | N | J |
| E0130400701LM | Potassium | 7440-09-7 | 1170 | 43000 | N | J |
| E0130400801LM | Potassium | 7440-09-7 | 996 | 43000 | *N | J |
| E0130400901LM | Potassium | 7440-09-7 | 1230 | 43000 | N | J |

Table B-3. (continued).

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|---------------|-------------------------|
| E0130401001LM | Potassium | 7440-09-7 | 1120 | 43000 | *N | J |
| E0130401101LM | Potassium | 7440-09-7 | 980 | 43000 | *N | J |
| E0130400901LM | Selenium | 7782-49-2 | 0.381 | 850 | B | |
| E0130400801LM | Silver | 7440-22-4 | 0.122 | 9800 | B | |
| E0130401001LM | Silver | 7440-22-4 | 0.187 | 9800 | B | |
| E0130401101LM | Silver | 7440-22-4 | 0.158 | 9800 | B | |
| E0130400001LM | Sodium | 7440-23-5 | 198 | 3200 | | |
| E0130400101LM | Sodium | 7440-23-5 | 211 | 3200 | | |
| E0130400201LM | Sodium | 7440-23-5 | 182 | 3200 | | |
| E0130400301LM | Sodium | 7440-23-5 | 175 | 3200 | | |
| E0130400401LM | Sodium | 7440-23-5 | 1800 | 3200 | | |
| E0130400501LM | Sodium | 7440-23-5 | 156 | 3200 | | |
| E0130400601LM | Sodium | 7440-23-5 | 202 | 3200 | | |
| E0130400701LM | Sodium | 7440-23-5 | 205 | 3200 | | |
| E0130400801LM | Sodium | 7440-23-5 | 273 | 3200 | * | |
| E0130400901LM | Sodium | 7440-23-5 | 183 | 3200 | | |
| E0130401001LM | Sodium | 7440-23-5 | 194 | 3200 | * | |
| E0130401101LM | Sodium | 7440-23-5 | 156 | 3200 | * | |
| E0130400001LM | Vanadium | 7440-62-2 | 32.5 | 450 | | |
| E0130400101LM | Vanadium | 7440-62-2 | 32.7 | 450 | | |
| E0130400201LM | Vanadium | 7440-62-2 | 32.3 | 450 | | |
| E0130400301LM | Vanadium | 7440-62-2 | 29.9 | 450 | | |
| E0130400401LM | Vanadium | 7440-62-2 | 43.2 | 450 | | |
| E0130400501LM | Vanadium | 7440-62-2 | 32.2 | 450 | | |
| E0130400601LM | Vanadium | 7440-62-2 | 36.2 | 450 | | |
| E0130400701LM | Vanadium | 7440-62-2 | 37.2 | 450 | | |
| E0130400801LM | Vanadium | 7440-62-2 | 32.7 | 450 | | |
| E0130400901LM | Vanadium | 7440-62-2 | 30.3 | 450 | * | |
| E0130401001LM | Vanadium | 7440-62-2 | 33.8 | 450 | | |
| E0130401101LM | Vanadium | 7440-62-2 | 27.3 | 450 | | |
| E0130400001LM | Zinc | 7440-66-6 | 60.9 | 210000 | | |
| E0130400101LM | Zinc | 7440-66-6 | 58.2 | 210000 | | |
| E0130400201LM | Zinc | 7440-66-6 | 59.3 | 210000 | | |
| E0130400301LM | Zinc | 7440-66-6 | 59.3 | 210000 | | |
| E0130400401LM | Zinc | 7440-66-6 | 70.6 | 210000 | | |
| E0130400501LM | Zinc | 7440-66-6 | 58.6 | 210000 | | |
| E0130400601LM | Zinc | 7440-66-6 | 59.4 | 210000 | | |
| E0130400701LM | Zinc | 7440-66-6 | 60.6 | 210000 | | |
| E0130400801LM | Zinc | 7440-66-6 | 58.3 | 210000 | N | J |
| E0130400901LM | Zinc | 7440-66-6 | 55.2 | 210000 | *N | J |
| E0130401001LM | Zinc | 7440-66-6 | 51.1 | 210000 | N | J |
| E0130401101LM | Zinc | 7440-66-6 | 52.7 | 210000 | N | J |

Table B-4. Level 1 – Detected radionuclides.

| Sample Number | Constituent | CAS | Concentration (pCi/kg) | ICDF WAC (pCi/kg) | Validation Qualifier |
|---------------|-------------------|------------|---------------------------|----------------------|-------------------------|
| E0130400001RH | Americium-241 | 14596-10-2 | 2.5E-04 | 1.0E+07 | |
| E0130400101RH | Americium-241 | 14596-10-2 | 3.5E-04 | 1.0E+07 | |
| E0130400201RH | Americium-241 | 14596-10-2 | 4.6E-03 | 1.0E+07 | |
| E0130400301RH | Americium-241 | 14596-10-2 | 4.9E-04 | 1.0E+07 | |
| E0130400601RH | Americium-241 | 14596-10-2 | 2.7E-04 | 1.0E+07 | |
| E0130400701RH | Americium-241 | 14596-10-2 | 2.7E-04 | 1.0E+07 | |
| E0130400801RH | Americium-241 | 14596-10-2 | 1.2E-03 | 1.0E+07 | |
| E0130400901RH | Americium-241 | 14596-10-2 | 1.3E-03 | 1.0E+07 | |
| E0130401001RH | Americium-241 | 14596-10-2 | 4.1E-04 | 1.0E+07 | |
| E0130401101RH | Americium-241 | 14596-10-2 | 2.1E-04 | 1.0E+07 | |
| E0130401001RH | Cesium-134 | 13967-70-9 | 3.6E-04 | 1.1E+07 | |
| E0130400001RH | Cesium-137 | 10045-97-3 | 1.8E-01 | 2.3E+12 | |
| E0130400101RH | Cesium-137 | 10045-97-3 | 1.4E-01 | 2.3E+12 | |
| E0130400201RH | Cesium-137 | 10045-97-3 | 1.1E+00 | 2.3E+12 | |
| E0130400301RH | Cesium-137 | 10045-97-3 | 2.0E-01 | 2.3E+12 | |
| E0130400401RH | Cesium-137 | 10045-97-3 | 9.6E-02 | 2.3E+12 | |
| E0130400501RH | Cesium-137 | 10045-97-3 | 2.1E-01 | 2.3E+12 | |
| E0130400601RH | Cesium-137 | 10045-97-3 | 6.8E-01 | 2.3E+12 | |
| E0130400701RH | Cesium-137 | 10045-97-3 | 5.4E-01 | 2.3E+12 | |
| E0130400801RH | Cesium-137 | 10045-97-3 | 1.4E+00 | 2.3E+12 | |
| E0130400901RH | Cesium-137 | 10045-97-3 | 3.3E+00 | 2.3E+12 | |
| E0130401001RH | Cesium-137 | 10045-97-3 | 3.3E+00 | 2.3E+12 | |
| E0130401101RH | Cesium-137 | 10045-97-3 | 1.3E+00 | 2.3E+12 | |
| E0130400201RH | Cobalt-60 | 10198-40-0 | 3.5E-04 | 1.9E+08 | |
| E0130400701RH | Cobalt-60 | 10198-40-0 | 4.2E-04 | 1.9E+08 | |
| E0130400901RH | Cobalt-60 | 10198-40-0 | 2.4E-04 | 1.9E+08 | |
| E0130400201RH | Europium-154 | 15585-10-1 | 1.3E-03 | 8.2E+08 | |
| E0130400801RH | Europium-154 | 15585-10-1 | 2.6E-03 | 8.2E+08 | J |
| E0130400901RH | Europium-154 | 15585-10-1 | 4.3E-03 | 8.2E+08 | J |
| E0130401001RH | Europium-154 | 15585-10-1 | 3.6E-03 | 8.2E+08 | J |
| E0130401101RH | Neptunium-237 | 13994-20-2 | 3.7E-05 | 6.4E+05 | J |
| E0130400001RH | Plutonium-238 | 13981-16-3 | 1.6E-03 | 1.0E+07 | |
| E0130400101RH | Plutonium-238 | 13981-16-3 | 2.7E-03 | 1.0E+07 | |
| E0130400201RH | Plutonium-238 | 13981-16-3 | 6.1E-03 | 1.0E+07 | |
| E0130400301RH | Plutonium-238 | 13981-16-3 | 7.6E-04 | 1.0E+07 | |
| E0130400401RH | Plutonium-238 | 13981-16-3 | 1.7E-04 | 1.0E+07 | |
| E0130400501RH | Plutonium-238 | 13981-16-3 | 8.2E-04 | 1.0E+07 | |
| E0130400601RH | Plutonium-238 | 13981-16-3 | 1.9E-03 | 1.0E+07 | |
| E0130400701RH | Plutonium-238 | 13981-16-3 | 1.6E-03 | 1.0E+07 | |
| E0130400801RH | Plutonium-238 | 13981-16-3 | 1.0E-02 | 1.0E+07 | |
| E0130400901RH | Plutonium-238 | 13981-16-3 | 1.0E-02 | 1.0E+07 | |
| E0130401001RH | Plutonium-238 | 13981-16-3 | 3.7E-03 | 1.0E+07 | |
| E0130401101RH | Plutonium-238 | 13981-16-3 | 6.1E-04 | 1.0E+07 | |
| E0130400001RH | Plutonium-239/240 | | 2.3E-04 | 1.5E+06 | |
| E0130400101RH | Plutonium-239/240 | | 3.0E-04 | 1.5E+06 | |
| E0130400201RH | Plutonium-239/240 | | 5.8E-04 | 1.5E+06 | |
| E0130400301RH | Plutonium-239/240 | | 5.8E-05 | 1.5E+06 | J |
| E0130400401RH | Plutonium-239/240 | | 3.2E-05 | 1.5E+06 | J |
| E0130400501RH | Plutonium-239/240 | | 9.0E-05 | 1.5E+06 | J |

Table B-4. (continued).

| Sample Number | Constituent | CAS | Concentration (pCi/kg) | ICDF WAC (pCi/kg) | Validation Qualifier |
|---------------|-------------------|------------|---------------------------|----------------------|-------------------------|
| E0130400601RH | Plutonium-239/240 | | 2.5E-04 | 1.5E+06 | |
| E0130400701RH | Plutonium-239/240 | | 1.8E-04 | 1.5E+06 | |
| E0130400801RH | Plutonium-239/240 | | 7.0E-03 | 1.5E+06 | |
| E0130400901RH | Plutonium-239/240 | | 5.8E-04 | 1.5E+06 | |
| E0130401001RH | Plutonium-239/240 | | 4.0E-04 | 1.5E+06 | |
| E0130401101RH | Plutonium-239/240 | | 1.3E-04 | 1.5E+06 | |
| E0130400001RH | Radium-226 | 13982-63-3 | 1.1E-03 | 4.7E+05 | J |
| E0130400101RH | Radium-226 | 13982-63-3 | 8.7E-04 | 4.7E+05 | J |
| E0130400301RH | Radium-226 | 13982-63-3 | 1.3E-03 | 4.7E+05 | J |
| E0130400501RH | Radium-226 | 13982-63-3 | 2.2E-03 | 4.7E+05 | J |
| E0130400601RH | Radium-226 | 13982-63-3 | 1.2E-03 | 4.7E+05 | J |
| E0130400801RH | Radium-226 | 13982-63-3 | 1.2E-03 | 4.7E+05 | J |
| E0130400001RH | Strontium-90 | 10098-97-2 | 5.2E-01 | 3.5E+12 | |
| E0130400101RH | Strontium-90 | 10098-97-2 | 1.7E+00 | 3.5E+12 | |
| E0130400201RH | Strontium-90 | 10098-97-2 | 2.6E+00 | 3.5E+12 | |
| E0130400301RH | Strontium-90 | 10098-97-2 | 3.8E-01 | 3.5E+12 | |
| E0130400401RH | Strontium-90 | 10098-97-2 | 1.7E-01 | 3.5E+12 | |
| E0130400501RH | Strontium-90 | 10098-97-2 | 3.2E+00 | 3.5E+12 | |
| E0130400601RH | Strontium-90 | 10098-97-2 | 1.7E+00 | 3.5E+12 | |
| E0130400701RH | Strontium-90 | 10098-97-2 | 1.0E+00 | 3.5E+12 | |
| E0130400801RH | Strontium-90 | 10098-97-2 | 4.3E+00 | 3.5E+12 | |
| E0130400901RH | Strontium-90 | 10098-97-2 | 4.5E+00 | 3.5E+12 | |
| E0130401001RH | Strontium-90 | 10098-97-2 | 3.2E+00 | 3.5E+12 | |
| E0130401101RH | Strontium-90 | 10098-97-2 | 2.2E+00 | 3.5E+12 | |
| E0130400801RH | Technetium-99 | 14133-76-7 | 3.7E-03 | 5.8E+06 | |
| E0130400001RH | Thorium-228 | 14274-82-9 | 1.7E-03 | 1.6E+04 | |
| E0130400101RH | Thorium-228 | 14274-82-9 | 1.3E-03 | 1.6E+04 | |
| E0130400201RH | Thorium-228 | 14274-82-9 | 1.6E-03 | 1.6E+04 | |
| E0130400301RH | Thorium-228 | 14274-82-9 | 1.4E-03 | 1.6E+04 | |
| E0130400401RH | Thorium-228 | 14274-82-9 | 1.2E-03 | 1.6E+04 | |
| E0130400501RH | Thorium-228 | 14274-82-9 | 1.7E-03 | 1.6E+04 | |
| E0130400601RH | Thorium-228 | 14274-82-9 | 1.6E-03 | 1.6E+04 | |
| E0130400701RH | Thorium-228 | 14274-82-9 | 1.4E-03 | 1.6E+04 | |
| E0130400801RH | Thorium-228 | 14274-82-9 | 1.5E-03 | 1.6E+04 | |
| E0130400901RH | Thorium-228 | 14274-82-9 | 1.4E-03 | 1.6E+04 | |
| E0130401001RH | Thorium-228 | 14274-82-9 | 1.8E-03 | 1.6E+04 | |
| E0130401101RH | Thorium-228 | 14274-82-9 | 1.7E-03 | 1.6E+04 | |
| E0130400001RH | Thorium-230 | 14269-63-7 | 1.4E-03 | 1.4E+04 | J |
| E0130400101RH | Thorium-230 | 14269-63-7 | 1.2E-03 | 1.4E+04 | |
| E0130400201RH | Thorium-230 | 14269-63-7 | 1.3E-03 | 1.4E+04 | |
| E0130400301RH | Thorium-230 | 14269-63-7 | 1.6E-03 | 1.4E+04 | |
| E0130400401RH | Thorium-230 | 14269-63-7 | 1.7E-03 | 1.4E+04 | |
| E0130400501RH | Thorium-230 | 14269-63-7 | 1.1E-03 | 1.4E+04 | |
| E0130400601RH | Thorium-230 | 14269-63-7 | 1.0E-03 | 1.4E+04 | |
| E0130400701RH | Thorium-230 | 14269-63-7 | 1.1E-03 | 1.4E+04 | |
| E0130400801RH | Thorium-230 | 14269-63-7 | 1.7E-03 | 1.4E+04 | |
| E0130400901RH | Thorium-230 | 14269-63-7 | 1.9E-03 | 1.4E+04 | |
| E0130401001RH | Thorium-230 | 14269-63-7 | 1.8E-03 | 1.4E+04 | |
| E0130401101RH | Thorium-230 | 14269-63-7 | 1.8E-03 | 1.4E+04 | |
| E0130400001RH | Thorium-232 | 7440-29-1 | 1.3E-03 | 1.7E+04 | |
| E0130400101RH | Thorium-232 | 7440-29-1 | 1.0E-03 | 1.7E+04 | |

Table B-4. (continued).

| Sample Number | Constituent | CAS | Concentration (pCi/kg) | ICDF WAC (pCi/kg) | Validation Qualifier |
|---------------|-----------------|------------|---------------------------|----------------------|-------------------------|
| E0130400201RH | Thorium-232 | 7440-29-1 | 1.1E-03 | 1.7E+04 | |
| E0130400301RH | Thorium-232 | 7440-29-1 | 1.2E-03 | 1.7E+04 | |
| E0130400401RH | Thorium-232 | 7440-29-1 | 7.8E-04 | 1.7E+04 | |
| E0130400501RH | Thorium-232 | 7440-29-1 | 1.5E-03 | 1.7E+04 | |
| E0130400601RH | Thorium-232 | 7440-29-1 | 1.2E-03 | 1.7E+04 | |
| E0130400701RH | Thorium-232 | 7440-29-1 | 1.3E-03 | 1.7E+04 | |
| E0130400801RH | Thorium-232 | 7440-29-1 | 1.3E-03 | 1.7E+04 | |
| E0130400901RH | Thorium-232 | 7440-29-1 | 1.1E-03 | 1.7E+04 | |
| E0130401001RH | Thorium-232 | 7440-29-1 | 1.8E-03 | 1.7E+04 | |
| E0130401101RH | Thorium-232 | 7440-29-1 | 1.4E-03 | 1.7E+04 | |
| E0130400001RH | Uranium-233/234 | | 1.1E-03 | 6.0E+06 | |
| E0130400101RH | Uranium-233/234 | | 9.1E-04 | 6.0E+06 | |
| E0130400201RH | Uranium-233/234 | | 3.0E-03 | 6.0E+06 | |
| E0130400301RH | Uranium-233/234 | | 1.1E-03 | 6.0E+06 | |
| E0130400401RH | Uranium-233/234 | | 5.4E-04 | 6.0E+06 | |
| E0130400501RH | Uranium-233/234 | | 9.5E-04 | 6.0E+06 | |
| E0130400601RH | Uranium-233/234 | | 1.0E-03 | 6.0E+06 | |
| E0130400701RH | Uranium-233/234 | | 1.0E-03 | 6.0E+06 | |
| E0130400801RH | Uranium-233/234 | | 1.2E-03 | 6.0E+06 | |
| E0130400901RH | Uranium-233/234 | | 1.0E-03 | 6.0E+06 | |
| E0130401001RH | Uranium-233/234 | | 1.2E-03 | 6.0E+06 | |
| E0130401101RH | Uranium-233/234 | | 1.3E-03 | 6.0E+06 | |
| E0130400001RH | Uranium-235 | 15117-96-1 | 9.2E-05 | 1.1E+05 | J |
| E0130400101RH | Uranium-235 | 15117-96-1 | 2.1E-04 | 1.1E+05 | |
| E0130400201RH | Uranium-235 | 15117-96-1 | 2.1E-04 | 1.1E+05 | |
| E0130400301RH | Uranium-235 | 15117-96-1 | 9.1E-05 | 1.1E+05 | |
| E0130400501RH | Uranium-235 | 15117-96-1 | 8.1E-05 | 1.1E+05 | J |
| E0130400601RH | Uranium-235 | 15117-96-1 | 1.1E-04 | 1.1E+05 | |
| E0130400701RH | Uranium-235 | 15117-96-1 | 3.2E-04 | 1.1E+05 | |
| E0130400801RH | Uranium-235 | 15117-96-1 | 9.6E-05 | 1.1E+05 | |
| E0130400901RH | Uranium-235 | 15117-96-1 | 8.4E-05 | 1.1E+05 | |
| E0130401001RH | Uranium-235 | 15117-96-1 | 1.4E-04 | 1.1E+05 | |
| E0130401101RH | Uranium-235 | 15117-96-1 | 8.1E-05 | 1.1E+05 | J |
| E0130400001RH | Uranium-238 | 7440-61-1 | 9.4E-04 | 2.0E+06 | |
| E0130400101RH | Uranium-238 | 7440-61-1 | 9.3E-04 | 2.0E+06 | |
| E0130400201RH | Uranium-238 | 7440-61-1 | 9.9E-04 | 2.0E+06 | |
| E0130400301RH | Uranium-238 | 7440-61-1 | 9.3E-04 | 2.0E+06 | |
| E0130400401RH | Uranium-238 | 7440-61-1 | 6.4E-04 | 2.0E+06 | |
| E0130400501RH | Uranium-238 | 7440-61-1 | 1.0E-03 | 2.0E+06 | |
| E0130400601RH | Uranium-238 | 7440-61-1 | 9.8E-04 | 2.0E+06 | |
| E0130400701RH | Uranium-238 | 7440-61-1 | 1.0E-03 | 2.0E+06 | |
| E0130400801RH | Uranium-238 | 7440-61-1 | 1.2E-03 | 2.0E+06 | |
| E0130400901RH | Uranium-238 | 7440-61-1 | 1.0E-03 | 2.0E+06 | |
| E0130401001RH | Uranium-238 | 7440-61-1 | 1.0E-03 | 2.0E+06 | |
| E0130401101RH | Uranium-238 | 7440-61-1 | 1.3E-03 | 2.0E+06 | |
| E0130400801RH | Zinc-65 | 13982-39-3 | 1.8E-04 | NA | |

Table B-5. Level 2 – Detected organic compounds.

| Sample Number | Constituent | CAS # | Concentration (mg/kg) | LDR Limit (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|---------------------|----------|--------------------------|----------------------|---------------------|---------------|----------------------|
| E0130401201AV | 1,4-Dichlorobenzene | 106-46-7 | 0.00088 | 6 | 44 | J | J |
| E0130401301AV | 1,4-Dichlorobenzene | 106-46-7 | 0.00076 | 6 | 44 | J | J |
| E0130401302AV | 1,4-Dichlorobenzene | 106-46-7 | 0.00073 | 6 | 44 | J | J |
| E0130401401AV | 1,4-Dichlorobenzene | 106-46-7 | 0.00072 | 6 | 44 | J | J |
| E0130401201AV | Methylene chloride | 75-09-2 | 0.0016 | 30 | 27 | J | J |
| E0130401301AV | Methylene chloride | 75-09-2 | 0.0015 | 30 | 27 | J | J |
| E0130401302AV | Methylene chloride | 75-09-2 | 0.0017 | 30 | 27 | J | J |
| E0130401401AV | Methylene chloride | 75-09-2 | 0.0017 | 30 | 27 | J | J |
| E0130401201HN | Pyrene | 129-00-0 | 0.0819 | 8.2 | 250 | J | J |
| E0130401201AV | Toluene | 108-88-3 | 0.00042 | 10 | 30 | J | J |

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|--------------|------------|--------------------------|---------------------|---------------|----------------------|
| E0130401201PC | Aroclor-1254 | 11097-69-1 | 0.0086 | 130 | J | J |
| E0130401301PC | Aroclor-1254 | 11097-69-1 | 0.0378 | 130 | | |
| E0130401302PC | Aroclor-1254 | 11097-69-1 | 0.0104 | 130 | J | J |
| E0130401401PC | Aroclor-1254 | 11097-69-1 | 0.0174 | 130 | | |
| E0130401201PC | Aroclor-1260 | 11096-82-5 | 0.0068 | 500 | J | J |
| E0130401301PC | Aroclor-1260 | 11096-82-5 | 0.0157 | 500 | | |
| E0130401302PC | Aroclor-1260 | 11096-82-5 | 0.0129 | 500 | | |
| E0130401401PC | Aroclor-1260 | 11096-82-5 | 0.0095 | 500 | J | J |

Table B-6. Level 2 – Detected TCLP metals.

| Sample Number | Constituent | CAS | Concentration (mg/L) | LDR Limit (mg/L) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|-------------------------|---------------------|---------------|----------------------|
| E0130401301VY | Antimony | 7440-36-0 | 0.055 | 1.15 | B | |
| E0130401201VY | Barium | 7440-39-3 | 0.7 | 21 | B | |
| E0130401301VY | Barium | 7440-39-3 | 0.58 | 21 | B | |
| E0130401302VY | Barium | 7440-39-3 | 0.71 | 21 | B | |
| E0130401401VY | Barium | 7440-39-3 | 0.62 | 21 | B | |
| E0130401201VY | Beryllium | 7440-41-7 | 0.0049 | 1.22 | B | |
| E0130401201VY | Chromium | 7440-47-3 | 0.015 | 0.6 | B | |
| E0130401401VY | Mercury | 7439-97-6 | 0.000483 | 0.025 | B | |

Table B-7. Level 2 – Detected total metals.

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|------------------|-------------------------|
| E0130401201LM | Aluminum | 7429-90-5 | 7200 | 160000 | * | |
| E0130401301LM | Aluminum | 7429-90-5 | 7590 | 160000 | * | |
| E0130401302LM | Aluminum | 7429-90-5 | 7590 | 160000 | * | |
| E0130401401LM | Aluminum | 7429-90-5 | 7020 | 160000 | * | |
| E0130401201LM | Arsenic | 7440-38-2 | 6.24 | 58 | | |
| E0130401301LM | Arsenic | 7440-38-2 | 6.93 | 58 | | |
| E0130401302LM | Arsenic | 7440-38-2 | 11.6 | 58 | | |
| E0130401401LM | Arsenic | 7440-38-2 | 6.48 | 58 | | |
| E0130401201LM | Barium | 7440-39-3 | 103 | 3000 | *N | J |
| E0130401301LM | Barium | 7440-39-3 | 123 | 3000 | *N | J |
| E0130401302LM | Barium | 7440-39-3 | 120 | 3000 | *N | J |
| E0130401401LM | Barium | 7440-39-3 | 122 | 3000 | *N | J |
| E0130401201LM | Beryllium | 7440-41-7 | 0.54 | 18 | | |
| E0130401301LM | Beryllium | 7440-41-7 | 0.538 | 18 | | |
| E0130401302LM | Beryllium | 7440-41-7 | 0.557 | 18 | | |
| E0130401401LM | Beryllium | 7440-41-7 | 0.519 | 18 | | |
| E0130401201LM | Cadmium | 7440-43-9 | 0.375 | 3600 | B | |
| E0130401301LM | Cadmium | 7440-43-9 | 0.437 | 3600 | B | |
| E0130401302LM | Cadmium | 7440-43-9 | 0.43 | 3600 | B | |
| E0130401401LM | Cadmium | 7440-43-9 | 0.432 | 3600 | B | |
| E0130401201LM | Chromium | 7440-47-3 | 23.6 | 41000 | * | |
| E0130401301LM | Chromium | 7440-47-3 | 21.3 | 41000 | * | |
| E0130401302LM | Chromium | 7440-47-3 | 22 | 41000 | * | |
| E0130401401LM | Chromium | 7440-47-3 | 21 | 41000 | * | |
| E0130401201LM | Cobalt | 7440-48-4 | 4.53 | 100 | * | J |
| E0130401301LM | Cobalt | 7440-48-4 | 5.17 | 100 | * | J |
| E0130401302LM | Cobalt | 7440-48-4 | 5.42 | 100 | * | J |
| E0130401401LM | Cobalt | 7440-48-4 | 3.98 | 100 | * | J |
| E0130401201LM | Iron | 7439-89-6 | 13700 | 240000 | * | J |
| E0130401301LM | Iron | 7439-89-6 | 13900 | 240000 | * | J |
| E0130401302LM | Iron | 7439-89-6 | 13500 | 240000 | * | J |
| E0130401401LM | Iron | 7439-89-6 | 12200 | 240000 | * | J |
| E0130401201LM | Lead | 7439-92-1 | 7.09 | 58000 | | |
| E0130401301LM | Lead | 7439-92-1 | 9.91 | 58000 | | |
| E0130401302LM | Lead | 7439-92-1 | 14.5 | 58000 | | |
| E0130401401LM | Lead | 7439-92-1 | 6.81 | 58000 | | |
| E0130401201LM | Magnesium | 7439-95-4 | 4990 | 120000 | * | J |
| E0130401301LM | Magnesium | 7439-95-4 | 4990 | 120000 | * | J |
| E0130401302LM | Magnesium | 7439-95-4 | 4740 | 120000 | * | J |

Table B-7. (continued).

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|---------------|----------------------|
| E0130401401LM | Magnesium | 7439-95-4 | 4440 | 120000 | * | J |
| E0130401201LM | Manganese | 7439-96-5 | 157 | 4900 | *N | J |
| E0130401301LM | Manganese | 7439-96-5 | 169 | 4900 | *N | J |
| E0130401302LM | Manganese | 7439-96-5 | 195 | 4900 | *N | J |
| E0130401401LM | Manganese | 7439-96-5 | 158 | 4900 | *N | J |
| E0130401201LM | Mercury | 7439-97-6 | 0.037 | 9500 | | |
| E0130401301LM | Mercury | 7439-97-6 | 0.504 | 9500 | | |
| E0130401302LM | Mercury | 7439-97-6 | 0.533 | 9500 | | |
| E0130401401LM | Mercury | 7439-97-6 | 0.042 | 9500 | | |
| E0130401201LM | Nickel | 7440-02-0 | 19.5 | 350 | * | |
| E0130401301LM | Nickel | 7440-02-0 | 20.1 | 350 | * | |
| E0130401302LM | Nickel | 7440-02-0 | 20 | 350 | * | |
| E0130401401LM | Nickel | 7440-02-0 | 17.2 | 350 | * | |
| E0130401201LM | Potassium | 7440-09-7 | 1460 | 43000 | *N | J |
| E0130401301LM | Potassium | 7440-09-7 | 1420 | 43000 | *N | J |
| E0130401302LM | Potassium | 7440-09-7 | 1410 | 43000 | *N | J |
| E0130401401LM | Potassium | 7440-09-7 | 1340 | 43000 | *N | J |
| E0130401201LM | Silver | 7440-22-4 | 0.269 | 9800 | B | |
| E0130401301LM | Silver | 7440-22-4 | 0.22 | 9800 | B | |
| E0130401302LM | Silver | 7440-22-4 | 0.217 | 9800 | B | |
| E0130401401LM | Silver | 7440-22-4 | 0.203 | 9800 | B | |
| E0130401201LM | Sodium | 7440-23-5 | 175 | 3200 | | |
| E0130401301LM | Sodium | 7440-23-5 | 175 | 3200 | | |
| E0130401302LM | Sodium | 7440-23-5 | 178 | 3200 | | |
| E0130401401LM | Sodium | 7440-23-5 | 203 | 3200 | | |
| E0130401201LM | Thallium | 7440-28-0 | 1.86 | 43 | B | |
| E0130401301LM | Thallium | 7440-28-0 | 1.93 | 43 | B | |
| E0130401302LM | Thallium | 7440-28-0 | 1.72 | 43 | B | |
| E0130401401LM | Thallium | 7440-28-0 | 1.83 | 43 | B | |
| E0130401201LM | Vanadium | 7440-62-2 | 39.1 | 450 | *N | J |
| E0130401301LM | Vanadium | 7440-62-2 | 37.1 | 450 | *N | J |
| E0130401302LM | Vanadium | 7440-62-2 | 36.6 | 450 | *N | J |
| E0130401401LM | Vanadium | 7440-62-2 | 33.3 | 450 | *N | J |
| E0130401201LM | Zinc | 7440-66-6 | 48.6 | 210000 | E | J |
| E0130401301LM | Zinc | 7440-66-6 | 59.7 | 210000 | E | J |
| E0130401302LM | Zinc | 7440-66-6 | 57.5 | 210000 | E | J |
| E0130401401LM | Zinc | 7440-66-6 | 51.8 | 210000 | E | J |

Table B-8. Level 2 – Detected radionuclides.

| Sample Number | Constituent | CAS # | Concentration (pCi/kg) | ICDF WAC (pCi/kg) | Validation Qualifier |
|---------------|-------------------|------------|---------------------------|----------------------|-------------------------|
| E0130401201RH | Americium-241 | 14596-10-2 | 1.05E-03 | 1.0E+07 | |
| E0130401301RH | Americium-241 | 14596-10-2 | 1.53E-02 | 1.0E+07 | |
| E0130401302RH | Americium-241 | 14596-10-2 | 2.94E-02 | 1.0E+07 | |
| E0130401401RH | Americium-241 | 14596-10-2 | 1.81E-03 | 1.0E+07 | |
| E0130401201RH | Cesium-137 | 10045-97-3 | 2.43E+00 | 2.3E+12 | |
| E0130401301RH | Cesium-137 | 10045-97-3 | 1.35E+01 | 2.3E+12 | |
| E0130401302RH | Cesium-137 | 10045-97-3 | 3.11E+01 | 2.3E+12 | |
| E0130401401RH | Cesium-137 | 10045-97-3 | 8.49E+00 | 2.3E+12 | |
| E0130401201RH | Cobalt-60 | 10198-40-0 | 4.47E-04 | 1.9E+08 | |
| E0130401401RH | Cobalt-60 | 10198-40-0 | 1.49E-03 | 1.9E+08 | |
| E0130401201RH | Europium-154 | 15585-10-1 | 3.77E-03 | 8.2E+08 | |
| E0130401302RH | Europium-154 | 15585-10-1 | 1.76E-02 | 8.2E+08 | |
| E0130401401RH | Europium-154 | 15585-10-1 | 8.58E-03 | 8.2E+08 | |
| E0130401201RH | Plutonium-238 | 13981-16-3 | 3.42E-03 | 1.0E+07 | |
| E0130401301RH | Plutonium-238 | 13981-16-3 | 1.13E-01 | 1.0E+07 | |
| E0130401302RH | Plutonium-238 | 13981-16-3 | 2.84E-01 | 1.0E+07 | |
| E0130401401RH | Plutonium-238 | 13981-16-3 | 7.54E-03 | 1.0E+07 | |
| E0130401201RH | Plutonium-239/240 | | 5.56E-04 | 1.5E+06 | J |
| E0130401301RH | Plutonium-239/240 | | 2.51E-02 | 1.5E+06 | |
| E0130401302RH | Plutonium-239/240 | | 5.67E-02 | 1.5E+06 | |
| E0130401401RH | Plutonium-239/240 | | 1.21E-03 | 1.5E+06 | |
| E0130401201RH | Strontium-90 | 10098-97-2 | 7.71E+00 | 3.5E+12 | |
| E0130401301RH | Strontium-90 | 10098-97-2 | 2.67E+00 | 3.5E+12 | |
| E0130401302RH | Strontium-90 | 10098-97-2 | 4.44E+00 | 3.5E+12 | |
| E0130401401RH | Strontium-90 | 10098-97-2 | 1.04E+01 | 3.5E+12 | |
| E0130401301RH | Technetium-99 | 14133-76-7 | 5.99E-03 | 5.8E+06 | J |
| E0130401201RH | Thorium-228 | 14274-82-9 | 1.93E-03 | 1.6E+04 | |
| E0130401301RH | Thorium-228 | 14274-82-9 | 1.41E-03 | 1.6E+04 | |
| E0130401302RH | Thorium-228 | 14274-82-9 | 1.71E-03 | 1.6E+04 | |
| E0130401401RH | Thorium-228 | 14274-82-9 | 8.65E-04 | 1.6E+04 | |
| E0130401201RH | Thorium-230 | 14269-63-7 | 1.68E-03 | 1.4E+04 | J |
| E0130401301RH | Thorium-230 | 14269-63-7 | 1.65E-03 | 1.4E+04 | J |
| E0130401302RH | Thorium-230 | 14269-63-7 | 1.51E-03 | 1.4E+04 | J |
| E0130401401RH | Thorium-230 | 14269-63-7 | 1.04E-03 | 1.4E+04 | J |
| E0130401201RH | Thorium-232 | 7440-29-1 | 1.26E-03 | 1.7E+04 | |
| E0130401301RH | Thorium-232 | 7440-29-1 | 1.18E-03 | 1.7E+04 | |
| E0130401302RH | Thorium-232 | 7440-29-1 | 1.33E-03 | 1.7E+04 | |
| E0130401401RH | Thorium-232 | 7440-29-1 | 8.24E-04 | 1.7E+04 | |
| E0130401301RH | Tritium | 10028-17-8 | 8.47E-02 | 5.0E+07 | |
| E0130401201RH | Uranium-233/234 | | 8.39E-04 | 6.0E+06 | J |
| E0130401301RH | Uranium-233/234 | | 9.95E-04 | 6.0E+06 | J |
| E0130401302RH | Uranium-233/234 | | 1.01E-03 | 6.0E+06 | J |

Table B-8. (continued).

| Sample Number | Constituent | CAS # | Concentration (pCi/kg) | ICDF WAC (pCi/kg) | Validation Qualifier |
|---------------|-----------------|------------|---------------------------|----------------------|-------------------------|
| E0130401401RH | Uranium-233/234 | | 7.84E-04 | 6.0E+06 | J |
| E0130401201RH | Uranium-235 | 15117-96-1 | 2.13E-04 | 1.1E+05 | J |
| E0130401302RH | Uranium-235 | 15117-96-1 | 1.97E-04 | 1.1E+05 | J |
| E0130401201RH | Uranium-238 | 7440-61-1 | 8.86E-04 | 2.0E+06 | |
| E0130401301RH | Uranium-238 | 7440-61-1 | 1.01E-03 | 2.0E+06 | |
| E0130401302RH | Uranium-238 | 7440-61-1 | 9.29E-04 | 2.0E+06 | |
| E0130401401RH | Uranium-238 | 7440-61-1 | 9.95E-04 | 2.0E+06 | |

Table B-9. Level 3 – Detected organic compounds.

| Sample Number | Constituent | CAS # | Concentration (mg/kg) | LDR Limit (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|---------------------|----------|--------------------------|-------------------------|------------------|-------------------------|
| E0130401501AV | 1,4-Dichlorobenzene | 106-46-7 | 0.00076 | 6 | J | J |
| E0130401502AV | 1,4-Dichlorobenzene | 106-46-7 | 0.00048 | 6 | J | J |
| E0130401502AV | Acetone | 67-64-1 | 0.0083 | 160 | | |
| E0130401501AV | Toluene | 108-88-3 | 0.00076 | 10 | J | J |

| Sample Number | Constituent | CAS # | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|--------------|------------|--------------------------|------------------------|------------------|-------------------------|
| E0130401501PC | Aroclor-1254 | 11097-69-1 | 0.0102 | 130 | J | J |
| E0130401502PC | Aroclor-1254 | 11097-69-1 | 0.0091 | 130 | J | J |
| E0130401501PC | Aroclor-1260 | 11096-82-5 | 0.0111 | 500 | | |
| E0130401502PC | Aroclor-1260 | 11096-82-5 | 0.0091 | 500 | J | J |

Table B-10. Level 3 – Detected TCLP metals.

| Sample Number | Constituent | CAS | Concentration (mg/L) | LDR Limit (mg/L) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|-------------------------|------------------------|------------------|-------------------------|
| E0130401501VY | Barium | 7440-39-3 | 0.72 | 21 | B | |
| E0130401502VY | Barium | 7440-39-3 | 0.69 | 21 | B | |

Table B-11. Level 3 – Detected total metals.

| Sample Number | Constituent | CAS # | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|------------------|-------------------------|
| E0130401501LM | Aluminum | 7429-90-5 | 7950 | 160000 | | |
| E0130401502LM | Aluminum | 7429-90-5 | 7950 | 160000 | | |
| E0130401501LM | Arsenic | 7440-38-2 | 6.47 | 58 | * | |
| E0130401502LM | Arsenic | 7440-38-2 | 7.51 | 58 | * | |
| E0130401501LM | Barium | 7440-39-3 | 108 | 3000 | N | J |
| E0130401502LM | Barium | 7440-39-3 | 129 | 3000 | N | J |
| E0130401501LM | Beryllium | 7440-41-7 | 0.637 | 18 | | |
| E0130401502LM | Beryllium | 7440-41-7 | 0.596 | 18 | | |
| E0130401501LM | Cadmium | 7440-43-9 | 0.395 | 3600 | B | |
| E0130401502LM | Cadmium | 7440-43-9 | 0.412 | 3600 | B | |
| E0130401501LM | Chromium | 7440-47-3 | 26.7 | 41000 | | |
| E0130401502LM | Chromium | 7440-47-3 | 24.7 | 41000 | | |
| E0130401501LM | Cobalt | 7440-48-4 | 5.39 | 100 | | |
| E0130401502LM | Cobalt | 7440-48-4 | 4.23 | 100 | | |
| E0130401501LM | Copper | 7440-50-8 | 15.2 | 30000 | * | J |
| E0130401502LM | Copper | 7440-50-8 | 14.9 | 30000 | * | J |
| E0130401501LM | Iron | 7439-89-6 | 14600 | 240000 | | |
| E0130401502LM | Iron | 7439-89-6 | 12800 | 240000 | | |
| E0130401501LM | Lead | 7439-92-1 | 10.5 | 58000 | | |
| E0130401502LM | Lead | 7439-92-1 | 9.4 | 58000 | | |
| E0130401501LM | Magnesium | 7439-95-4 | 4640 | 120000 | | |
| E0130401502LM | Magnesium | 7439-95-4 | 4710 | 120000 | | |
| E0130401501LM | Manganese | 7439-96-5 | 176 | 4900 | N | J |
| E0130401502LM | Manganese | 7439-96-5 | 203 | 4900 | N | J |
| E0130401501LM | Nickel | 7440-02-0 | 17.4 | 350 | * | J |
| E0130401502LM | Nickel | 7440-02-0 | 17.6 | 350 | * | J |
| E0130401501LM | Potassium | 7440-09-7 | 1540 | 43000 | N | J |
| E0130401502LM | Potassium | 7440-09-7 | 1470 | 43000 | N | J |
| E0130401501LM | Silver | 7440-22-4 | 0.54 | 9800 | | |
| E0130401502LM | Silver | 7440-22-4 | 0.416 | 9800 | B | |
| E0130401501LM | Sodium | 7440-23-5 | 276 | 3200 | * | |
| E0130401502LM | Sodium | 7440-23-5 | 191 | 3200 | * | |
| E0130401501LM | Thallium | 7440-28-0 | 2.17 | 43 | | |
| E0130401502LM | Thallium | 7440-28-0 | 1.77 | 43 | B | |
| E0130401501LM | Vanadium | 7440-62-2 | 36.9 | 450 | | |
| E0130401502LM | Vanadium | 7440-62-2 | 32.9 | 450 | | |
| E0130401501LM | Zinc | 7440-66-6 | 56.2 | 210000 | *E | J |
| E0130401502LM | Zinc | 7440-66-6 | 50.4 | 210000 | *E | J |

Table B-12. Level 3 – Detected radionuclides.

| Sample Number | Constituent | CAS # | Concentration (pCi/kg) | ICDF WAC (pCi/kg) | Validation Qualifier |
|---------------|-------------------|------------|---------------------------|----------------------|-------------------------|
| E0130401501RH | Americium-241 | 14596-10-2 | 6.62E+02 | 1.0E+07 | |
| E0130401502RH | Americium-241 | 14596-10-2 | 5.98E+02 | 1.0E+07 | |
| E0130401501RH | Cesium-137 | 10045-97-3 | 1.55E+05 | 2.3E+12 | J |
| E0130401502RH | Cesium-137 | 10045-97-3 | 2.50E+05 | 2.3E+12 | J |
| E0130401501RH | Neptunium-237 | 13994-20-2 | 6.70E-01 | 6.4E+05 | |
| E0130401502RH | Neptunium-237 | 13994-20-2 | 5.32E-01 | 6.4E+05 | |
| E0130401501RH | Plutonium-238 | 13981-16-3 | 8.41E+03 | 1.0E+07 | |
| E0130401502RH | Plutonium-238 | 13981-16-3 | 1.05E+04 | 1.0E+07 | |
| E0130401501RH | Plutonium-239/240 | | 4.86E+03 | 1.5E+06 | |
| E0130401502RH | Plutonium-239/240 | | 5.15E+03 | 1.5E+06 | |
| E0130401501RH | Radium-226 | 13982-63-3 | 1.51E+00 | 4.7E+05 | J |
| E0130401502RH | Radium-226 | 13982-63-3 | 1.40E+00 | 4.7E+05 | J |
| E0130401501RH | Strontium-90 | 10098-97-2 | 7.78E+04 | 3.5E+12 | |
| E0130401502RH | Strontium-90 | 10098-97-2 | 4.80E+04 | 3.5E+12 | |
| E0130401501RH | Technetium-99 | 14133-76-7 | 1.25E+03 | 5.8E+06 | J |
| E0130401502RH | Technetium-99 | 14133-76-7 | 2.18E+02 | 5.8E+06 | J |
| E0130401501RH | Thorium-228 | 14274-82-9 | 3.92E+00 | 1.6E+04 | J |
| E0130401502RH | Thorium-228 | 14274-82-9 | 3.31E+00 | 1.6E+04 | J |
| E0130401501RH | Thorium-230 | 14269-63-7 | 2.48E+00 | 1.4E+04 | J |
| E0130401502RH | Thorium-230 | 14269-63-7 | 1.28E+00 | 1.4E+04 | J |
| E0130401501RH | Thorium-232 | 7440-29-1 | 1.14E+00 | 1.7E+04 | |
| E0130401502RH | Thorium-232 | 7440-29-1 | 1.23E+00 | 1.7E+04 | |
| E0130401501RH | Uranium-233/234 | | 1.26E+01 | 6.0E+06 | |
| E0130401502RH | Uranium-233/234 | | 1.27E+01 | 6.0E+06 | |
| E0130401501RH | Uranium-235 | 15117-96-1 | 9.18E-01 | 1.1E+05 | |
| E0130401502RH | Uranium-235 | 15117-96-1 | 1.49E+00 | 1.1E+05 | |
| E0130401501RH | Uranium-238 | 7440-61-1 | 1.33E+00 | 2.0E+06 | |
| E0130401502RH | Uranium-238 | 7440-61-1 | 1.21E+00 | 2.0E+06 | |

Table B-13. CPP-97 south soil stockpile – Detected organic compounds.

| Sample Number | Constituent | CAS | Concentration (mg/kg) | LDR Limit (mg/kg) | ICDF Limit (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|--|----------|-----------------------|-------------------|--------------------|---------------|----------------------|
| E01304075011X | Acenaphthene | 83-32-9 | 0.0352 | 3.4 | 21 | J | J |
| E01304075011X | Benzo(a)pyrene | 50-32-8 | 0.0937 | 3.4 | 110 | J | J |
| E0130407601HN | bis(2-Ethylhexyl) phthalate | 117-81-7 | 0.205 | NA | 150 | J | J |
| E0130407701HN | bis(2-Ethylhexyl) phthalate | 117-81-7 | 0.42 | NA | 150 | J | J |
| E0130407702HN | bis(2-Ethylhexyl) phthalate | 117-81-7 | 0.152 | NA | 150 | J | J |
| E01304075011X | Fluorene | 86-73-7 | 0.0159 | 3.4 | NA | J | J |
| E0130407601HN | Hexanedioic acid, bis(2-ethylhexyl) este | 103-23-1 | 1.66 | NA | NA | NJ | |
| E0130407702HN | Hexanedioic acid, bis(2-ethylhexyl) este | 103-23-1 | 0.99 | NA | NA | NJ | |
| E0130407601HN | Phenol | 108-95-2 | 0.212 | 6.2 | 80 | J | J |
| E0130407702HN | Phenol | 108-95-2 | 0.107 | 6.2 | 80 | J | J |
| E0130407702HN | Triphenyl phosphate | 115-86-6 | 0.423 | NA | NA | NJ | |

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|--------------|------------|-----------------------|------------------|---------------|----------------------|
| E0130407501PB | Aroclor-1254 | 11097-69-1 | 0.0513 | 130 | | |
| E0130407601PC | Aroclor-1254 | 11097-69-1 | 0.0229 | 130 | | |
| E0130407702PC | Aroclor-1254 | 11097-69-1 | 0.005 | 130 | J | J |
| E0130407501PB | Aroclor-1260 | 11096-82-5 | 0.17 | 500 | | |
| E0130407601PC | Aroclor-1260 | 11096-82-5 | 0.0297 | 500 | | |
| E0130407702PC | Aroclor-1260 | 11096-82-5 | 0.0041 | 500 | J | J |

Table B-14. CPP-97 south soil stockpile – Detected TCLP metals.

| Sample Number | Constituent | CAS | Concentration (mg/L) | LDR Limit (mg/L) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|----------------------|------------------|---------------|----------------------|
| E0130407501VY | Barium | 7440-39-3 | 1.21 | 21 | B | |
| E0130407601VY | Barium | 7440-39-3 | 0.743 | 21 | B | |
| E0130407701VY | Barium | 7440-39-3 | 0.591 | 21 | B | |
| E0130407702VY | Barium | 7440-39-3 | 0.536 | 21 | B | |
| E0130407501VY | Cadmium | 7440-43-9 | 0.01 | 0.11 | B | |
| E0130407601VY | Cadmium | 7440-43-9 | 0.009 | 0.11 | B | |
| E0130407701VY | Cadmium | 7440-43-9 | 0.011 | 0.11 | B | |
| E0130407702VY | Cadmium | 7440-43-9 | 0.011 | 0.11 | B | |
| E0130407501VY | Chromium | 7440-47-3 | 0.009 | 0.6 | B | |
| E0130407601VY | Chromium | 7440-47-3 | 0.008 | 0.6 | B | |
| E0130407701VY | Chromium | 7440-47-3 | 0.008 | 0.6 | B | |

Table B-15. CPP-97 south soil stockpile – Detected total metals.

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|---------------|----------------------|
| E0130407501LM | Aluminum | 7429-90-5 | 11150 | 160000 | | |
| E0130407601LM | Aluminum | 7429-90-5 | 7630 | 160000 | | |
| E0130407701LM | Aluminum | 7429-90-5 | 6910 | 160000 | | |
| E0130407702LM | Aluminum | 7429-90-5 | 7620 | 160000 | | |
| E0130407601LM | Antimony | 7440-36-0 | 3.22 | 160000 | N | J |
| E0130407501LM | Arsenic | 7440-38-2 | 7.86 | 58 | | |
| E0130407601LM | Arsenic | 7440-38-2 | 4.99 | 58 | | |
| E0130407701LM | Arsenic | 7440-38-2 | 5.84 | 58 | | |
| E0130407702LM | Arsenic | 7440-38-2 | 7.82 | 58 | | |
| E0130407501LM | Barium | 7440-39-3 | 172 | 3000 | | |
| E0130407601LM | Barium | 7440-39-3 | 122 | 3000 | | |
| E0130407701LM | Barium | 7440-39-3 | 110 | 3000 | | |
| E0130407702LM | Barium | 7440-39-3 | 126 | 3000 | | |
| E0130407501LM | Beryllium | 7440-41-7 | 0.748 | 18 | | |
| E0130407601LM | Beryllium | 7440-41-7 | 0.55 | 18 | | |
| E0130407701LM | Beryllium | 7440-41-7 | 0.498 | 18 | B | |
| E0130407702LM | Beryllium | 7440-41-7 | 0.555 | 18 | | |
| E0130407501LM | Cadmium | 7440-43-9 | 0.335 | 3600 | B | |
| E0130407601LM | Cadmium | 7440-43-9 | 0.139 | 3600 | B | |
| E0130407701LM | Cadmium | 7440-43-9 | 0.269 | 3600 | B | |
| E0130407702LM | Cadmium | 7440-43-9 | 0.276 | 3600 | B | |
| E0130407501LM | Calcium | 7440-70-2 | 22150 | No Limit | * | R |
| E0130407601LM | Calcium | 7440-70-2 | 14360 | No Limit | * | R |
| E0130407701LM | Calcium | 7440-70-2 | 16910 | No Limit | * | R |
| E0130407702LM | Calcium | 7440-70-2 | 33410 | No Limit | * | R |
| E0130407501LM | Chromium | 7440-47-3 | 28.1 | 41000 | * | J |
| E0130407601LM | Chromium | 7440-47-3 | 19.9 | 41000 | * | J |
| E0130407701LM | Chromium | 7440-47-3 | 20.6 | 41000 | * | J |
| E0130407702LM | Chromium | 7440-47-3 | 21.2 | 41000 | * | J |
| E0130407501LM | Cobalt | 7440-48-4 | 5.31 | 110 | | |
| E0130407601LM | Cobalt | 7440-48-4 | 3.87 | 110 | | |
| E0130407701LM | Cobalt | 7440-48-4 | 3.76 | 110 | | |
| E0130407702LM | Cobalt | 7440-48-4 | 4.13 | 110 | | |
| E0130407501LM | Copper | 7440-50-8 | 16.2 | 30000 | | |
| E0130407601LM | Copper | 7440-50-8 | 15.6 | 30000 | | |
| E0130407701LM | Copper | 7440-50-8 | 16.2 | 30000 | | |
| E0130407702LM | Copper | 7440-50-8 | 17.8 | 30000 | | |
| E0130407501LM | Iron | 7439-89-6 | 14300 | 240000 | | |
| E0130407601LM | Iron | 7439-89-6 | 11050 | 240000 | | |
| E0130407701LM | Iron | 7439-89-6 | 10320 | 240000 | | |
| E0130407702LM | Iron | 7439-89-6 | 11400 | 240000 | | |
| E0130407501LM | Lead | 7439-92-1 | 12.8 | 58000 | | |
| E0130407601LM | Lead | 7439-92-1 | 11.9 | 58000 | | |
| E0130407701LM | Lead | 7439-92-1 | 8.8 | 58000 | | |

Table B-15. (continued).

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|------------------|-------------------------|
| E0130407702LM | Lead | 7439-92-1 | 8.93 | 58000 | | |
| E0130407501LM | Magnesium | 7439-95-4 | 5580 | 120000 | | |
| E0130407601LM | Magnesium | 7439-95-4 | 3860 | 120000 | | |
| E0130407701LM | Magnesium | 7439-95-4 | 3810 | 120000 | | |
| E0130407702LM | Magnesium | 7439-95-4 | 5310 | 120000 | | |
| E0130407501LM | Manganese | 7439-96-5 | 240 | 4900 | | |
| E0130407601LM | Manganese | 7439-96-5 | 172 | 4900 | | |
| E0130407701LM | Manganese | 7439-96-5 | 145 | 4900 | | |
| E0130407702LM | Manganese | 7439-96-5 | 176 | 4900 | | |
| E0130407501LM | Mercury | 7439-97-6 | 0.0205 | 9500 | | |
| E0130407601LM | Mercury | 7439-97-6 | 0.0689 | 9500 | | |
| E0130407701LM | Mercury | 7439-97-6 | 0.027 | 9500 | | |
| E0130407702LM | Mercury | 7439-97-6 | 0.0167 | 9500 | | |
| E0130407501LM | Nickel | 7440-02-0 | 22 | 350 | | |
| E0130407601LM | Nickel | 7440-02-0 | 16.4 | 350 | | |
| E0130407701LM | Nickel | 7440-02-0 | 16.3 | 350 | | |
| E0130407702LM | Nickel | 7440-02-0 | 19.4 | 350 | | |
| E0130407501LM | Potassium | 7440-09-7 | 2600 | 43000 | | |
| E0130407601LM | Potassium | 7440-09-7 | 1740 | 43000 | | |
| E0130407701LM | Potassium | 7440-09-7 | 1580 | 43000 | | |
| E0130407702LM | Potassium | 7440-09-7 | 1800 | 43000 | | |
| E0130407501LM | Selenium | 7782-49-2 | 0.498 | 850 | B | |
| E0130407601LM | Selenium | 7782-49-2 | 0.164 | 850 | U | |
| E0130407701LM | Selenium | 7782-49-2 | 0.266 | 850 | B | |
| E0130407501LM | Silver | 7440-22-4 | 0.184 | 9800 | B | |
| E0130407601LM | Silver | 7440-22-4 | 0.117 | 9800 | B | |
| E0130407701LM | Silver | 7440-22-4 | 0.124 | 9800 | B | |
| E0130407702LM | Silver | 7440-22-4 | 0.143 | 9800 | B | |
| E0130407501LM | Sodium | 7440-23-5 | 290 | 3200 | * | |
| E0130407601LM | Sodium | 7440-23-5 | 240 | 3200 | * | |
| E0130407701LM | Sodium | 7440-23-5 | 149 | 3200 | * | |
| E0130407702LM | Sodium | 7440-23-5 | 184 | 3200 | * | |
| E0130407501LM | Thallium | 7440-28-0 | 5.11 | 4.3 | | |
| E0130407601LM | Thallium | 7440-28-0 | 3.93 | 4.3 | | |
| E0130407701LM | Thallium | 7440-28-0 | 3.52 | 4.3 | | |
| E0130407702LM | Thallium | 7440-28-0 | 3.08 | 4.3 | | |
| E0130407501LM | Vanadium | 7440-62-2 | 37.6 | 450 | | |
| E0130407601LM | Vanadium | 7440-62-2 | 34.2 | 450 | | |
| E0130407701LM | Vanadium | 7440-62-2 | 41.8 | 450 | | |
| E0130407702LM | Vanadium | 7440-62-2 | 35.9 | 450 | | |
| E0130407501LM | Zinc | 7440-66-6 | 78.4 | 210000 | N | J |
| E0130407601LM | Zinc | 7440-66-6 | 52.4 | 210000 | N | J |
| E0130407701LM | Zinc | 7440-66-6 | 51.5 | 210000 | N | J |
| E0130407702LM | Zinc | 7440-66-6 | 60.9 | 210000 | N | J |

Table B-16. CPP-97 south soil stockpile – Detected radionuclides.

| Sample Number | Constituent | CAS | Concentration (pCi/kg) | ICDF WAC (pCi/kg) | Validation Qualifier |
|---------------|-------------------|------------|---------------------------|----------------------|-------------------------|
| E0130407501RH | Americium-241 | 14596-10-2 | 3.0E-04 | 1.0E+07 | J |
| E0130407701RH | Americium-241 | 14596-10-2 | 2.4E-04 | 1.0E+07 | J |
| E0130407702RH | Americium-241 | 14596-10-2 | 2.2E-04 | 1.0E+07 | J |
| E0130407501RH | Cesium-137 | 10045-97-3 | 1.2E-01 | 2.3E+12 | |
| E0130407601RH | Cesium-137 | 10045-97-3 | 4.7E-02 | 2.3E+12 | |
| E0130407701RH | Cesium-137 | 10045-97-3 | 8.8E-02 | 2.3E+12 | |
| E0130407702RH | Cesium-137 | 10045-97-3 | 1.1E-01 | 2.3E+12 | |
| E0130407501RH | Plutonium-238 | 13981-16-3 | 2.0E-03 | 1.0E+07 | |
| E0130407601RH | Plutonium-238 | 13981-16-3 | 1.3E-03 | 1.0E+07 | |
| E0130407701RH | Plutonium-238 | 13981-16-3 | 3.8E-03 | 1.0E+07 | |
| E0130407702RH | Plutonium-238 | 13981-16-3 | 8.6E-04 | 1.0E+07 | |
| E0130407501RH | Plutonium-239/240 | | 1.5E-03 | 1.5E+06 | |
| E0130407601RH | Plutonium-239/240 | | 6.9E-04 | 1.5E+06 | J |
| E0130407701RH | Plutonium-239/240 | | 3.0E-04 | 1.5E+06 | J |
| E0130407702RH | Plutonium-239/240 | | 6.0E-04 | 1.5E+06 | J |
| E0130407501RH | Radium-226 | 13982-63-3 | 1.1E-03 | 4.7E+05 | |
| E0130407601RH | Radium-226 | 13982-63-3 | 9.8E-04 | 4.7E+05 | |
| E0130407701RH | Radium-226 | 13982-63-3 | 1.0E-03 | 4.7E+05 | |
| E0130407702RH | Radium-226 | 13982-63-3 | 8.3E-04 | 4.7E+05 | |
| E0130407501RH | Strontium-90 | 10098-97-2 | 2.1E-01 | 3.5E+12 | |
| E0130407601RH | Strontium-90 | 10098-97-2 | 3.3E-02 | 3.5E+12 | |
| E0130407701RH | Strontium-90 | 10098-97-2 | 6.2E-02 | 3.5E+12 | |
| E0130407702RH | Strontium-90 | 10098-97-2 | 6.7E-02 | 3.5E+12 | |
| E0130407501RH | Thorium-228 | 14274-82-9 | 1.3E-03 | 1.6E+04 | J |
| E0130407601RH | Thorium-228 | 14274-82-9 | 1.8E-03 | 1.6E+04 | J |
| E0130407701RH | Thorium-228 | 14274-82-9 | 1.2E-03 | 1.6E+04 | J |
| E0130407702RH | Thorium-228 | 14274-82-9 | 1.4E-03 | 1.6E+04 | J |
| E0130407501RH | Thorium-230 | 14269-63-7 | 2.0E-03 | 1.6E+04 | J |
| E0130407601RH | Thorium-230 | 14269-63-7 | 2.5E-03 | 1.6E+04 | J |
| E0130407701RH | Thorium-230 | 14269-63-7 | 1.4E-03 | 1.6E+04 | J |
| E0130407702RH | Thorium-230 | 14269-63-7 | 2.0E-03 | 1.6E+04 | J |
| E0130407501RH | Thorium-232 | 7440-29-1 | 1.2E-03 | 1.6E+04 | |
| E0130407601RH | Thorium-232 | 7440-29-1 | 1.6E-03 | 1.6E+04 | |
| E0130407701RH | Thorium-232 | 7440-29-1 | 1.1E-03 | 1.6E+04 | |
| E0130407702RH | Thorium-232 | 7440-29-1 | 1.5E-03 | 1.6E+04 | |
| E0130407501RH | Uranium-233/234 | | 8.1E-04 | 6.0E+06 | |
| E0130407601RH | Uranium-233/234 | | 1.1E-03 | 6.0E+06 | |
| E0130407701RH | Uranium-233/234 | | 8.6E-04 | 6.0E+06 | |
| E0130407702RH | Uranium-233/234 | | 9.2E-04 | 6.0E+06 | |
| E0130407501RH | Uranium-235 | 15117-96-1 | 1.3E-04 | 1.1E+05 | J |
| E0130407601RH | Uranium-235 | 15117-96-1 | 7.2E-05 | 1.1E+05 | J |
| E0130407701RH | Uranium-235 | 15117-96-1 | 1.4E-04 | 1.1E+05 | |
| E0130407702RH | Uranium-235 | 15117-96-1 | 8.8E-05 | 1.1E+05 | J |
| E0130407501RH | Uranium-238 | 7440-61-1 | 1.0E-03 | 1.1E+05 | |
| E0130407601RH | Uranium-238 | 7440-61-1 | 8.1E-04 | 1.1E+05 | |
| E0130407701RH | Uranium-238 | 7440-61-1 | 7.3E-04 | 1.1E+05 | |
| E0130407702RH | Uranium-238 | 7440-61-1 | 8.0E-04 | 1.1E+05 | |

Table B-17. CPP-97 north soil stockpile – Detected organic compounds.

| Sample Number | Constituent | CAS | Concentration (mg/kg) | LDR Limit (mg/kg) | ICDF Limit (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|---|----------|--------------------------|-------------------------|--------------------------|------------------|-------------------------|
| E0130407801AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0028 | 6 | NA | | |
| E0130407901AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0016 | 7 | NA | | |
| E0130408001AV | 1,4-Dichlorobenzene | 106-46-7 | 0.0015 | 8 | NA | | |
| E0130407801HN | bis(2-Ethylhexyl) phthalate | 117-81-7 | 0.31 | NA | 150 | J | J |
| E0130408001HN | bis(2-Ethylhexyl) phthalate | 117-81-7 | 0.264 | NA | 151 | J | J |
| E0130407801HN | Hexanedioic acid, bis(2-ethylhexyl) este | 103-23-1 | 3.12 | NA | NA | NJ | |
| E0130408001HN | Hexanedioic acid, bis(2-ethylhexyl) este | 103-23-1 | 2.22 | NA | NA | NJ | |
| E0130407801HN | Phenol | 108-95-2 | 0.326 | 6.2 | 80 | J | J |
| E0130408001HN | Phenol | 108-95-2 | 0.23 | 6.2 | 80 | J | J |
| E0130407801HN | Phosphorous acid, triphenyl ester | 101-02-0 | 0.6 | NA | NA | NJ | |
| E0130408001HN | Phosphorous acid, triphenyl ester | 101-02-0 | 0.43 | NA | NA | NJ | |

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|--------------|------------|--------------------------|---------------------|------------------|-------------------------|
| E0130407801PC | Aroclor-1254 | 11097-69-1 | 0.0161 | 130 | | |
| E0130407901PC | Aroclor-1254 | 11097-69-1 | 0.0161 | 130 | | |
| E0130408001PC | Aroclor-1254 | 11097-69-1 | 0.0209 | 130 | | |
| E0130407801PC | Aroclor-1260 | 11096-82-5 | 0.025 | 500 | | |
| E0130407901PC | Aroclor-1260 | 11096-82-5 | 0.0154 | 500 | P | |
| E0130408001PC | Aroclor-1260 | 11096-82-5 | 0.0342 | 500 | | |

Table B-18. CPP-97 north soil stockpile – Detected TCLP metals.

| Sample Number | Constituent | CAS | Concentration (mg/L) | LDR Limit (mg/L) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|-------------------------|---------------------|------------------|-------------------------|
| E0130407801VY | Barium | 7440-39-3 | 1.21 | 21 | B | |
| E0130407901VY | Barium | 7440-39-3 | 0.821 | 21 | B | |
| E0130408001VY | Barium | 7440-39-3 | 0.97 | 21 | B | |
| E0130407801VY | Cadmium | 7440-43-9 | 0.01 | 0.11 | B | |
| E0130407901VY | Cadmium | 7440-43-9 | 0.009 | 0.11 | B | |
| E0130408001VY | Cadmium | 7440-43-9 | 0.009 | 0.11 | B | |
| E0130407801VY | Chromium | 7440-47-3 | 0.01 | 0.6 | B | |
| E0130408001VY | Chromium | 7440-47-3 | 0.009 | 0.6 | B | |
| E0130407801VY | Lead | 7439-92-1 | 0.03 | 0.75 | B | |
| E0130407801VY | Zinc | 7440-66-6 | 0.151 | 4.3 | B | |
| E0130407901VY | Zinc | 7440-66-6 | 0.165 | 4.3 | B | |

Table B-19. CPP-97 north soil stockpile – Detected total metals.

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|---------------|-------------------------|
| E0130407801LM | Aluminum | 7429-90-5 | 10220 | 160000 | | |
| E0130407901LM | Aluminum | 7429-90-5 | 9060 | 160000 | | |
| E0130408001LM | Aluminum | 7429-90-5 | 8290 | 160000 | | |
| E0130407801LM | Arsenic | 7440-38-2 | 5.64 | 58 | | |
| E0130407901LM | Arsenic | 7440-38-2 | 6.2 | 58 | | |
| E0130408001LM | Arsenic | 7440-38-2 | 6.12 | 58 | | |
| E0130407801LM | Barium | 7440-39-3 | 159 | 3000 | | |
| E0130407901LM | Barium | 7440-39-3 | 143 | 3000 | | |
| E0130408001LM | Barium | 7440-39-3 | 134 | 3000 | | |
| E0130407801LM | Beryllium | 7440-41-7 | 0.718 | 18 | | |
| E0130407901LM | Beryllium | 7440-41-7 | 0.643 | 18 | | |
| E0130408001LM | Beryllium | 7440-41-7 | 0.585 | 18 | | |
| E0130407801LM | Cadmium | 7440-43-9 | 0.186 | 3600 | B | |
| E0130407901LM | Cadmium | 7440-43-9 | 0.201 | 3600 | B | |
| E0130408001LM | Cadmium | 7440-43-9 | 0.164 | 3600 | B | |
| E0130407801LM | Chromium | 7440-47-3 | 32.5 | 41000 | * | J |
| E0130407901LM | Chromium | 7440-47-3 | 22.2 | 41000 | * | J |
| E0130408001LM | Chromium | 7440-47-3 | 20.7 | 41000 | * | J |
| E0130407801LM | Cobalt | 7440-48-4 | 5.35 | 110 | | |
| E0130407901LM | Cobalt | 7440-48-4 | 4.98 | 110 | | |
| E0130408001LM | Cobalt | 7440-48-4 | 4.44 | 110 | | |
| E0130407801LM | Copper | 7440-50-8 | 16 | 30000 | | |
| E0130407901LM | Copper | 7440-50-8 | 14.8 | 30000 | | |
| E0130408001LM | Copper | 7440-50-8 | 14.4 | 30000 | | |
| E0130407801LM | Iron | 7439-89-6 | 14790 | 240000 | | |
| E0130407901LM | Iron | 7439-89-6 | 13320 | 240000 | | |
| E0130408001LM | Iron | 7439-89-6 | 12130 | 240000 | | |
| E0130407801LM | Lead | 7439-92-1 | 9.71 | 58000 | | |
| E0130407901LM | Lead | 7439-92-1 | 9.81 | 58000 | | |
| E0130408001LM | Lead | 7439-92-1 | 10.6 | 58000 | | |
| E0130407801LM | Magnesium | 7439-95-4 | 5310 | 120000 | | |
| E0130407901LM | Magnesium | 7439-95-4 | 4660 | 120000 | | |
| E0130408001LM | Magnesium | 7439-95-4 | 4280 | 120000 | | |
| E0130407801LM | Manganese | 7439-96-5 | 238 | 4900 | | |
| E0130407901LM | Manganese | 7439-96-5 | 226 | 4900 | | |
| E0130408001LM | Manganese | 7439-96-5 | 205 | 4900 | | |
| E0130407801LM | Mercury | 7439-97-6 | 0.0427 | 9500 | | |

Table B-19. (continued).

| Sample Number | Constituent | CAS | Concentration (mg/kg) | ICDF WAC (mg/kg) | Lab Qualifier | Validation Qualifier |
|---------------|-------------|-----------|--------------------------|---------------------|---------------|-------------------------|
| E0130407901LM | Mercury | 7439-97-6 | 0.0732 | 9500 | | |
| E0130408001LM | Mercury | 7439-97-6 | 0.0454 | 9500 | | |
| E0130407801LM | Nickel | 7440-02-0 | 21.8 | 350 | | |
| E0130407901LM | Nickel | 7440-02-0 | 20.1 | 350 | | |
| E0130408001LM | Nickel | 7440-02-0 | 19.9 | 350 | | |
| E0130407801LM | Potassium | 7440-09-7 | 2060 | 43000 | | |
| E0130407901LM | Potassium | 7440-09-7 | 1890 | 43000 | | |
| E0130408001LM | Potassium | 7440-09-7 | 1780 | 43000 | | |
| E0130407801LM | Selenium | 7782-49-2 | 0.65 | 850 | | |
| E0130407901LM | Selenium | 7782-49-2 | 0.427 | 850 | B | |
| E0130408001LM | Selenium | 7782-49-2 | 0.555 | 850 | | |
| E0130407801LM | Silver | 7440-22-4 | 0.135 | 9800 | B | |
| E0130407901LM | Silver | 7440-22-4 | 0.136 | 9800 | B | |
| E0130408001LM | Silver | 7440-22-4 | 0.12 | 9800 | B | |
| E0130407801LM | Sodium | 7440-23-5 | 351 | 3200 | * | |
| E0130407901LM | Sodium | 7440-23-5 | 231 | 3200 | * | |
| E0130408001LM | Sodium | 7440-23-5 | 211 | 3200 | * | |
| E0130407801LM | Thallium | 7440-28-0 | 5.65 | 4.3 | | |
| E0130407901LM | Thallium | 7440-28-0 | 4.68 | 4.3 | | |
| E0130408001LM | Thallium | 7440-28-0 | 4.32 | 4.3 | | |
| E0130407801LM | Vanadium | 7440-62-2 | 38 | 450 | | |
| E0130407901LM | Vanadium | 7440-62-2 | 35 | 450 | | |
| E0130408001LM | Vanadium | 7440-62-2 | 34.2 | 450 | | |
| E0130407801LM | Zinc | 7440-66-6 | 65.8 | 210000 | N | J |
| E0130407901LM | Zinc | 7440-66-6 | 63.1 | 210000 | N | J |
| E0130408001LM | Zinc | 7440-66-6 | 76.8 | 210000 | N | J |

Table B-20. CPP-97 north soil stockpile – Detected radionuclides.

| Sample Number | Constituent | CAS | Concentration (pCi/kg) | ICDF WAC (pCi/kg) | Validation Qualifier |
|---------------|-------------------|------------|---------------------------|----------------------|-------------------------|
| E0130407801RH | Americium-241 | 14596-10-2 | 5.0E-03 | 1.0E+07 | |
| E0130407901RH | Americium-241 | 14596-10-2 | 4.0E-03 | 1.0E+07 | |
| E0130408001RH | Americium-241 | 14596-10-2 | 3.7E-03 | 1.0E+07 | |
| E0130407801RH | Cesium-137 | 10045-97-3 | 2.3E+00 | 2.3E+12 | |
| E0130407901RH | Cesium-137 | 10045-97-3 | 3.8E+00 | 2.3E+12 | |
| E0130408001RH | Cesium-137 | 10045-97-3 | 2.5E+00 | 2.3E+12 | |
| E0130407801RH | Cobalt-60 | 10198-40-0 | 3.9E-04 | 1.9E+08 | |
| E0130407901RH | Cobalt-60 | 10198-40-0 | 3.2E-04 | 1.9E+08 | |
| E0130407801RH | Europium-154 | 15585-10-1 | 1.1E-03 | 8.2E+08 | |
| E0130407901RH | Europium-154 | 15585-10-1 | 1.9E-03 | 8.2E+08 | |
| E0130408001RH | Europium-154 | 15585-10-1 | 1.4E-03 | 8.2E+08 | |
| E0130407801RH | Plutonium-238 | 13981-16-3 | 3.9E-02 | 1.0E+07 | |
| E0130407901RH | Plutonium-238 | 13981-16-3 | 4.8E-02 | 1.0E+07 | |
| E0130408001RH | Plutonium-238 | 13981-16-3 | 2.7E-02 | 1.0E+07 | |
| E0130407801RH | Plutonium-239/240 | | 4.2E-02 | 1.5E+06 | |
| E0130407901RH | Plutonium-239/240 | | 3.5E-02 | 1.5E+06 | |
| E0130408001RH | Plutonium-239/240 | | 3.8E-02 | 1.5E+06 | |
| E0130407801RH | Strontium-90 | 10098-97-2 | 7.2E+00 | 3.5E+12 | |
| E0130407901RH | Strontium-90 | 10098-97-2 | 3.6E+00 | 3.5E+12 | |
| E0130408001RH | Strontium-90 | 10098-97-2 | 4.0E+00 | 3.5E+12 | |
| E0130407801RH | Technetium-99 | 14133-76-7 | 2.4E-02 | 5.8E+06 | J |
| E0130407901RH | Technetium-99 | 14133-76-7 | 1.4E-02 | 5.8E+06 | J |
| E0130408001RH | Technetium-99 | 14133-76-7 | 1.4E-02 | 5.8E+06 | J |
| E0130407801RH | Thorium-228 | 14274-82-9 | 9.9E-04 | 1.6E+04 | J |
| E0130407901RH | Thorium-228 | 14274-82-9 | 1.2E-03 | 1.6E+04 | J |
| E0130408001RH | Thorium-228 | 14274-82-9 | 1.4E-03 | 1.6E+04 | J |
| E0130407801RH | Thorium-230 | 14269-63-7 | 2.2E-03 | 1.6E+04 | J |
| E0130407901RH | Thorium-230 | 14269-63-7 | 1.1E-03 | 1.6E+04 | J |
| E0130408001RH | Thorium-230 | 14269-63-7 | 1.5E-03 | 1.6E+04 | J |
| E0130407801RH | Thorium-232 | 7440-29-1 | 1.3E-03 | 1.6E+04 | |
| E0130407901RH | Thorium-232 | 7440-29-1 | 1.6E-03 | 1.6E+04 | |
| E0130408001RH | Thorium-232 | 7440-29-1 | 1.2E-03 | 1.6E+04 | |
| E0130407801RH | Uranium-233/234 | | 9.5E-04 | 6.0E+06 | |
| E0130407901RH | Uranium-233/234 | | 1.0E-03 | 6.0E+06 | |
| E0130408001RH | Uranium-233/234 | | 1.4E-03 | 6.0E+06 | |
| E0130407801RH | Uranium-235 | 15117-96-1 | 1.9E-04 | 1.1E+05 | |
| E0130407901RH | Uranium-235 | 15117-96-1 | 1.9E-04 | 1.1E+05 | |
| E0130408001RH | Uranium-235 | 15117-96-1 | 8.6E-05 | 1.1E+05 | J |
| E0130407801RH | Uranium-238 | 7440-61-1 | 8.5E-04 | 2.0E+06 | |
| E0130407901RH | Uranium-238 | 7440-61-1 | 8.3E-04 | 2.0E+06 | |
| E0130408001RH | Uranium-238 | 7440-61-1 | 8.4E-04 | 2.0E+06 | |

Appendix C

Operable Unit 3-13, Group 3, Other Surface Soils Remediation Set 1 (Phase 1) Iodine-129 Results

Table C-1. I-129 data for CPP-92/-98/-99.

| Sample Number | Location | Concentration (pCi/g) | Minimum Detectable Activity (pCi/g) | Combined Uncertainty | Validation Qualifier |
|---------------|----------------|--------------------------|--|-------------------------|-------------------------|
| E0130401601RI | Level 1 Box 1 | 1.2 | 1.1 | 0.4 | UJ |
| E0130401701RI | Level 1 Box 2 | 1.5 | 1.2 | 0.6 | UJ |
| E0130401801RI | Level 1 Box 3 | 2.2 | 1.3 | 0.5 | UJ |
| E0130401901RI | Level 1 Box 4 | -1.0 | 1.5 | 0.9 | U |
| E0130402001RI | Level 1 Box 5 | 47 | 1.2 | 2.8 | UJ |
| E0130402101RI | Level 1 Box 6 | 3.4 | 2.2 | 1.2 | UJ |
| E0130402201RI | Level 1 Box 7 | 2.9 | 1.3 | 0.7 | UJ |
| E0130402301RI | Level 1 Box 8 | 0.6 | 0.8 | 0.4 | U |
| E0130402401RI | Level 1 Box 9 | 0.1 | 0.7 | 0.3 | U |
| E0130402501RI | Level 1 Box 10 | 4.2 | 1.7 | 0.7 | UJ |
| E0130402502RI | Level 1 Box 10 | 0.3 | 1.2 | 0.7 | U |
| E0130402601RI | Level 1 Box 11 | 4.1 | 3.1 | 1.3 | UJ |
| E0130402701RI | Level 1 Box 12 | 2.9 | 1.3 | 0.6 | UJ |
| E0130402801RI | Level 1 Box 13 | 7.8 | 2.0 | 0.9 | UJ |
| E0130402901RI | Level 1 Box 14 | 8.1 | 1.9 | 0.9 | UJ |
| E0130403001RI | Level 1 Box 15 | 6.7 | 1.9 | 0.9 | UJ |
| E0130403101RI | Level 1 Box 16 | 2.3 | 1.2 | 0.5 | UJ |
| E0130403201RI | Level 1 Box 17 | 25 | 4.1 | 2.1 | UJ |
| E0130403301RI | Level 1 Box 18 | 6.5 | 2.7 | 1.4 | UJ |
| E0130403401RI | Level 1 Box 19 | 20 | 4.3 | 2.0 | UJ |
| E0130403501RI | Level 1 Box 20 | 0.7 | 1.2 | 0.7 | U |
| E0130403601RI | Level 1 Box 21 | 15 | 4.3 | 1.9 | UJ |
| E0130403701RI | Level 1 Box 22 | 9.1 | 2.6 | 1.1 | UJ |
| E0130403801RI | Level 1 Box 23 | 5.8 | 2.0 | 0.8 | UJ |
| E0130403901RI | Level 1 Box 24 | 11 | 2.1 | 1.0 | UJ |
| E0130404001RI | Level 1 Box 25 | 2.3 | 1.1 | 0.4 | UJ |
| E0130404101RI | Level 1 Box 26 | 9.9 | 2.1 | 1.0 | UJ |
| E0130404201RI | Level 1 Box 27 | 7.2 | 2.4 | 1.0 | UJ |
| E0130404301RI | Level 1 Box 28 | 34 | 4.0 | 2.5 | UJ |
| E0130404401RI | Level 1 Box 29 | 6.7 | 3.2 | 1.3 | UJ |
| E0130404501RI | Level 1 Box 30 | 16 | 2.7 | 1.3 | UJ |
| E0130404601RI | Level 1 Box 31 | 18 | 3.7 | 1.8 | UJ |
| E0130404701RI | Level 1 Box 32 | 9.8 | 3.8 | 2.6 | UJ |

Table C-1. (continued).

| Sample Number | Location | Concentration (pCi/g) | Minimum Detectable Activity (pCi/g) | Combined Uncertainty | Validation Qualifier |
|----------------------|-----------------------|--------------------------|--|-------------------------|-------------------------|
| E0130404801RI | Level 1 Box 33 | 41 | 4.9 | 3.1 | UJ |
| E0130404801RI | Level 1 Box 33 | 0.2 | 0.4 | 0.1 | U |
| E0130404901RI | Level 1 Box 34 | 5.2 | 2.1 | 0.9 | UJ |
| E0130405001RI | Level 1 Box 35 | 2.9 | 1.1 | 0.5 | UJ |
| E0130405101RI | Level 1 Box 36 | 11 | 3.4 | 1.5 | UJ |
| E0130405201RI | Level 1 Box 37 | 26 | 4.7 | 2.4 | UJ |
| E0130405301RI | Level 1 Box 38 | 11 | 3.3 | 1.5 | UJ |
| E0130405401RI | Level 1 Box 39 | 15 | 2.9 | 1.4 | UJ |
| E0130405501RI | Level 1 Box 40 | 31 | 4.4 | 2.5 | UJ |
| E0130405502RI | Level 1 Box 40 | 33 | 5.1 | 2.8 | UJ |
| E0130405601RI | Level 1 Box 41 | 0.0 | 0.9 | 0.5 | U |
| E0130405701RI | Level 1 Box 42 | 40 | 5.4 | 3.1 | UJ |
| E0130405801RI | Level 1 Box 43 | 131 | 5.3 | 7.8 | UJ |
| E0130405801RI | Level 1 Box 43 | -0.2 | 0.8 | 0.2 | U |
| E0130405901RI | Level 2 Box 1 | 0.0 | 0.1 | 0.1 | U |
| E0130406001RI | Level 2 Box 2 | 0.0 | 0.2 | 0.1 | U |
| E0130406101RI | Level 2 Box 3 | 0.0 | 0.1 | 0.0 | U |
| E0130406201RI | Level 2 Box 4 | 0.0 | 0.3 | 0.1 | U |
| E0130406202RI | Level 2 Box 4 | 0.1 | 0.2 | 0.1 | U |
| E0130406301RI | Level 2 Box 5 | 0.1 | 0.2 | 0.1 | UJ |
| E0130406401RI | Level 2 Box 6 | 0.2 | 0.2 | 0.1 | UJ |
| E0130406501RI | Level 2 Box 7 | -0.1 | 0.2 | 0.1 | U |
| E0130406601RI | Level 2 Box 8 | 0.0 | 0.1 | 0.0 | U |
| E0130406701RI | Level 2 Box 9 | 0.3 | 0.2 | 0.1 | UJ |
| E0130406801RI | Level 2 Box 10 | 0.1 | 0.1 | 0.0 | U |
| E0130406901RI | Level 2 Box 11 | 0.0 | 0.1 | 0.0 | U |
| E0130407001RI | Level 2 Box 12 | 0.0 | 0.2 | 0.1 | U |
| E0130407101RI | Level 3 Box 1 | 0.0 | 0.1 | 0.0 | U |
| E0130407201RI | Level 3 Box 2 | 1.2 | 0.8 | 0.4 | UJ |
| E0130407202RI | Level 3 Box 2 | 0.4 | 0.9 | 0.3 | U |
| E0130407301RI | Level 3 Box 3 | 0.0 | 0.1 | 0.0 | U |
| E0130407401RI | Level 3 Box 4 | 1.0 | 0.7 | 0.3 | UJ |

Note: **Bold** indicates result from second analytical method using radiochemical separation techniques.

Table C-2. I-129 results for CPP-97.

| Sample Number | Location | Concentration (pCi/g) | Minimum Detectable Activity (pCi/g) | Combined Uncertainty (pCi/g) | Validation Qualifier |
|----------------------|------------------------------|--------------------------|---|------------------------------------|-------------------------|
| E0130407501RI | South pile, west side | 0.3 | 0.95 | 0.5 | U |
| E0130407601RI | South pile, south side | 0.5 | 0.71 | 0.4 | U |
| E0130407701RI | South pile, east side | 0.02 | 0.82 | 0.4 | U |
| E0130407702RI | South pile, east side | 0.2 | 0.71 | 0.3 | U |
| E0130407801RI | North pile, east side | 19 | 5.2 | 2.3 | UJ |
| E0130407901RI | North pile, west side | 46 | 4.7 | 3.1 | UJ |
| E0130407901RI | North pile, west side | 0.05 | 0.5 | 0.1 | UJ |
| E0130408001RI | North pile, south side | 19 | 4.4 | 2.0 | UJ |

Note: **Bold** indicates result from second analytical method using radiochemical separation techniques.

Appendix D

**Operable Unit 3-13, Group 3,
Other Surface Soils Remediation Set 1 (Phase 1)
Precision Results from Sample Duplicates**

Appendix D

Operable Unit 3-13, Group 3, Other Surface Soils Remediation Set 1 (Phase 1) Precision Results from Sample Duplicates

Table D-1. RPD results for duplicate samples collected at Level 2 boxes (Sample ID E01304013).

| Constituent | Normal Sample | Duplicate Sample | Units | RPD |
|-------------------|---------------|------------------|-------|------|
| Arsenic | 6930 | 11600 | µg/kg | 50.4 |
| Beryllium | 538 | 557 | µg/kg | 3.5 |
| Lead | 9910 | 14500 | µg/kg | 37.6 |
| Mercury | 504 | 533 | µg/kg | 5.6 |
| Sodium | 175000 | 178000 | µg/kg | 1.7 |
| Aroclor-1260 | 15.7 | 12.9 | µg/kg | 19.6 |
| Americium-241 | 15.3 | 29.4 | pCi/g | 63.1 |
| Cesium-137 | 13500 | 31100 | pCi/g | 78.9 |
| Plutonium-238 | 113 | 284 | pCi/g | 86.1 |
| Plutonium-239/240 | 25.1 | 56.7 | pCi/g | 77.3 |
| Strontium-90 | 2670 | 4440 | pCi/g | 49.8 |
| Thorium-228 | 1.41 | 1.71 | pCi/g | 19.2 |
| Thorium-232 | 1.18 | 1.33 | pCi/g | 12.0 |
| Uranium-238 | 1.01 | 0.929 | pCi/g | 8.4 |

Table D-2. RPD results for duplicate samples collected at Level 3 boxes (Sample ID E01304015).

| Constituent | Normal Sample | Duplicate Sample | Units | RPD |
|-------------------|---------------|------------------|-------|------|
| Aluminum | 7950000 | 7950000 | µg/kg | 0.0 |
| Beryllium | 637 | 596 | µg/kg | 6.7 |
| Chromium | 26700 | 24700 | µg/kg | 7.8 |
| Cobalt | 5390 | 4230 | µg/kg | 24.1 |
| Iron | 14600000 | 12800000 | µg/kg | 13.1 |
| Lead | 10500 | 9400 | µg/kg | 11.1 |
| Magnesium | 4640000 | 4710000 | µg/kg | 1.5 |
| Vanadium | 36900 | 32900 | µg/kg | 11.5 |
| Americium-241 | 662 | 598 | pCi/g | 10.2 |
| Neptunium-237 | 0.67 | 0.532 | pCi/g | 23.0 |
| Plutonium-238 | 8410 | 10500 | pCi/g | 22.1 |
| Plutonium-239/240 | 4860 | 5150 | pCi/g | 5.8 |
| Strontium-90 | 77800 | 48000 | pCi/g | 47.4 |
| Thorium-232 | 1.14 | 1.23 | pCi/g | 7.6 |
| Uranium-233/234 | 12.6 | 12.7 | pCi/g | 0.8 |
| Uranium-235 | 0.918 | 1.49 | pCi/g | 47.5 |
| Uranium-238 | 1.33 | 1.21 | pCi/g | 9.4 |

Table D-3. RPD results for duplicate samples collected at soil stockpiles (Sample ID E01304077).

| Constituent | Normal Sample | Duplicate Sample | Units | RPD |
|---------------------|---------------|------------------|-------|-------|
| 1,4-Dichlorobenzene | 1.5 | 1.8 | µg/kg | 18.2 |
| Aluminum | 6910000 | 7620000 | µg/kg | 9.8 |
| Arsenic | 5840 | 7820 | µg/kg | 29.0 |
| Barium | 110000 | 126000 | µg/kg | 13.6 |
| Cobalt | 3760 | 4130 | µg/kg | 9.4 |
| Copper | 16200 | 17800 | µg/kg | 9.4 |
| Iron | 10320000 | 11400000 | µg/kg | 9.9 |
| Lead | 8800 | 8930 | µg/kg | 1.5 |
| Magnesium | 3810000 | 5310000 | µg/kg | 32.9 |
| Manganese | 145000 | 176000 | µg/kg | 19.3 |
| Mercury | 27 | 16.7 | µg/kg | 47.1 |
| Nickel | 16300 | 19400 | µg/kg | 17.4 |
| Potassium | 1580000 | 1800000 | µg/kg | 13.0 |
| Thallium | 3520 | 3080 | µg/kg | 13.3 |
| Vanadium | 41800 | 35900 | µg/kg | 15.2 |
| Cesium-137 | 87.5 | 106 | pCi/g | 19.1 |
| Plutonium-238 | 3.84 | 0.86 | pCi/g | 126.8 |
| Radium-226 | 1.01 | 0.83 | pCi/g | 19.6 |
| Strontium-90 | 62.1 | 66.8 | pCi/g | 7.3 |
| Thorium-232 | 1.05 | 1.51 | pCi/g | 35.9 |
| Uranium-233/234 | 0.856 | 0.924 | pCi/g | 7.6 |
| Uranium-238 | 0.734 | 0.799 | pCi/g | 8.5 |